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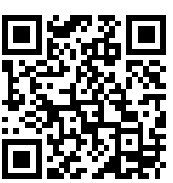

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JANUARY TO JUNE, 1917.

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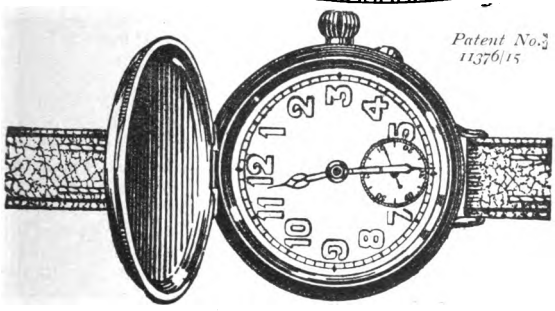

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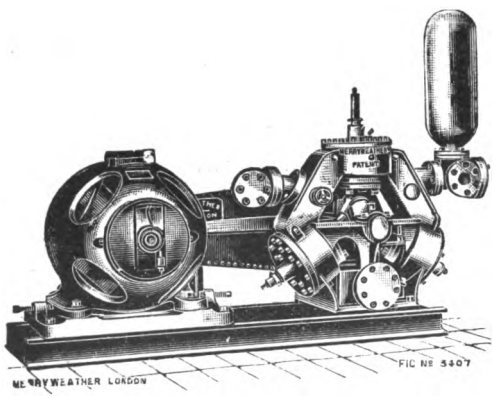

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FAMOUS ENGINEERS OF THE ALLIED ARMIES.

By COLONEL B. R. WARD.

KITCHENER.

ONE hundred and fifty years ago the rise of an officer of Artillery or Engineers to a position of high command in any of the European Armies was almost an unheard-of event. These two Corps were known as " Scientific Corps " and were not expected to produce men capable of commanding armies in the field.

It was in the French Army that this tradition was first broken. The rise of Napoleon from a Lieutenant of Artillery to a pinnacle of fame which " made past renown doubtful and future renown impossible "—to quote a contemporary phrase describing his career—marked the commencement of a new era for the various European corps of Artillery and Engineers.

No Engineers of Napoleon's army attained to any high command in the field ; but Carnot, the famous " organiser of Victory," was a Captain of Engineers in 1792, when he was appointed a member of the Committee of Public Safety. His great achievement consisted in the organisation of the Republican Armies when France was threatened by invasion on all sides. Carnot was never given a command in the field, but his work as an organiser was strangely prophetic of the work of the great Engineer who forms the subject of this memoir.

The position of the various Engineer Corps in the armies at war to-day may be gauged by the fact that the most prominent soldier in the German, French and British Armies in August, 1914, was in each case an Engineer officer. Von der Goltz, Joffre, and Kitchener were undoubtedly the ablest officers of their respective armies at the date in question.

Of the three men Kitchener undoubtedly had the most astonishing and varied career, and the dramatic circumstances of his death on the 5th June of this year have drawn the attention of the whole world to his character and achievements.

Horatio Herbert Kitchener was born in County Kerry, Ireland, on the 24th June, 1850. He entered the Royal Military Academy, Woolwich, in 1868, and before being commissioned as an officer of Engineers in 1871, he commenced his military career by offering his services to the French authorities and was by them appointed to the

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Second Army of the Loire, then commanded by General Chanzy. He joined as a private, enlisting in a Battalion of the Mobile Guard of the Department of Les Côtes du Nord.

Kitchener was not a man who talked much of his adventures and experiences. Beyond the fact that he made a perilous ascent in a war balloon with two French officers, and that he served actively in several engagements, little is known of this opening episode in his career. After Chanzy's failure to relieve Paris and his withdrawal to Le Mans, Kitchener was stricken down with pneumonia and invalided to England. After having been reprimanded for his escapade by the British Commander-in-Chief, Kitchener was duly gazetted to a commission in the Royal Engineers and joined at Chatham for a course of instruction in Military Engineering in 1871. While at Chatham he came under one of the most important influences of his life in the person of Colonel Fitzroy Somerset, who then held the position of Superintendent of Military Discipline at the School of Military Engineering. The lessons he learned in the way of discipline and the management of men from Colonel Fitzroy Somerset influenced his whole future career. "I never forgot what you taught me, Sir," were his words, spoken long afterwards in 1898 on his return from his victorious campaign in the Soudan to his old Chief, then on his deathbed, at Farnborough.

Three years of training at Chatham and Aldershot were followed by appointment to the Royal Engineers Field Telegraph Troop at the latter station. Home service was not, however, what Kitchener wanted, and an opportunity for foreign service presented itself in 1874 when he was offered the appointment of Surveyor in Palestine by the Palestine Exploration Fund.

The Society which calls itself by this curious title was founded in 1865. It was originated by certain English scholars who were engaged on Smith's Bible Dictionary, and who had come to the conclusion that our information on the subject of Biblical sites was singularly inadequate. The Society aimed at a systematic and complete survey of the whole country.

The next four years saw Kitchener with his colleague, Lieut. Conder, R.E., engaged in survey work in Palestine with intervals in London and Chatham, where the results of their observations were plotted. On the 10th September, 1878, he was able formally to hand over to the Committee of the Palestine Exploration Fund what was described in the Annual Report of the Fund as a complete map of Western Palestine on the scale of 1 in. to the mile. Every town, village, ruin, hill and plantation were marked upon it. Kitchener's part in this well-executed piece of work was widely recognized and he was shortly afterwards placed in charge of a similar piece of work, namely, the survey of the Island of Cyprus which had been ceded to Great Britain by the Treaty of Berlin in 1878. Kitchener's keenness

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to see, if not to take part, in any military operations that might be on hand is shown by the fact that he took the opportunity during one of his visits to England to return by way of Turkey, where he was present at some of the fighting in the Shipka Pass during the Russo-Turkish War of 1878. His experiences in this campaign were duly reported by him at the War Office and he shortly after joined at Cyprus and commenced a triangulation of the island, preparatory to the construction of a map of the new British possession on the scale of 1 in. to the mile.

For the next four years he was employed on this survey with a junior officer of Engineers as his colleague. He had not yet given any indication of the possession of supreme abilities, for his development was slow rather than brilliant. Already, however, he was beginning to display certain qualities which afterwards made him famous. On several occasions he gave proof of self-confidence to a very high degree and showed that complete absorption in the work in hand which enabled him in after life to carry out to complete success every enterprise which he took in hand. Thus on one occasion the local authorities insisted on a complete village survey on a large scale being undertaken, this detailed survey being pieced together in order to produce a complete map of the island. Kitchener at once sent in his resignation as a surveyor, stating that he belonged to a scientific corps and that a satisfactory map could not be produced by the method indicated. He was at that time engaged on the triangulation of the island which he maintained was absolutely necessary. As a result of his protest the survey was stopped for a short time, but he was again placed in charge of it when at a later date it was decided to restart and to continue the work on the lines insisted upon by him.

It has been stated that Kitchener was not a good rider, but this is not the case. He was at one time whip to the pack of hounds kept up by the English residents on the island. He took an interest in racing and rode himself at many of the race meetings. He was too heavy for flat racing, although he entered his ponies for the events, but he rode himself in races over jumps and on one occasion at least he won a cup for a steeplechase.

In 1882 the bombardment of Alexandria was carried out by the British fleet. Kitchener had no intention of being out of it and proceeded on leave to Alexandria. He managed to get himself taken on in some capacity with the British forces that landed after the bombardment and applied by telegram to the High Commissioner for leave. The leave was, however, refused, and Kitchener was obliged to return to Cyprus. The time for his work in Egypt had not yet come.

In 1883 he was promoted Captain and was definitely attached to the Egyptian Army, then in course of reorganization under British

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officers. In the following year he served on the staff of the British Expeditionary Force on the Nile and was promoted successively Major and Lieut.-Colonel by brevet for his services. From 1886 to 1888 he was Commandant at Suakin and was severely wounded in the action at Handub in 1888. In the same year he commanded a brigade in the actions of Gamaizieh and Toski. From 1889 to 1892 he was Adjutant-General of the Egyptian Army. In the same year he was appointed Commander-in-Chief or Sirdar of the Egyptian Army, and for the next three years he was engaged in reorganizing the forces of the Khedive, and had begun the formation of an expeditionary force which was destined to advance the Egyptian frontier far into the Soudan.

During all these years Kitchener displayed brilliant qualities both as an organiser and as an administrator. During the next three years he showed that he also possessed high qualities as a commander in the field. It is impossible within the limits of a short article to give in any detail an account of the brilliant military operations which ended in the re-conquest of the Soudan. Suffice it to say that in 1896 he won the action at Ferket and advanced the frontier and the railway to Dongola. In 1897 his lieutenant, Sir Archibald Hunter, gained at Abu Hamed a victory which carried the Egyptian flag one stage further south; and in 1898 after Kitchener had successfully stormed the Mahdist zareba on the river Atbara on the 8th of April an expedition consisting of 8,200 British and 17,600 native troops with 80 guns and 44 maxims was launched against Khartoum, at that time the headquarters of the Mahdi and his fanatical Arab army.

A striking feature of the Egyptian campaigns was the part played by the railway which Kitchener pushed forward as the army advanced southward. Luck and good fortune had attended Lord Kitchener throughout his various campaigns; but although fortune was on his side nothing had been left to chance. Never has any campaign vindicated more completely the importance of careful and thorough organisation than the campaign which culminated in the Battle of Omdurman and the destruction of the Mahdi's army on the 2nd September, 1898.

After the battle 9,000 Dervish dead whitened the plain, and thousands more were wounded, the remainder having been forced into the desert in utter and irretrievable defeat. The Anglo-Egyptian losses were under 400 killed and wounded. On the following Sunday across the river at Khartoum a memorial service was held which fitly embodied the significance of the whole expedition. The military objective was the destruction of the Dervish power and the winning back of the Soudan from barbarism to civilization. To Englishmen, however, the campaign was a crusade undertaken to avenge Gordon, the Governor-General of the Soudan, who had fallen in

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battle as the Lieutenant of the Khedive in 1885 after the memorable siege in which Khartoum—the outpost of Egyptian civilization—had at last fallen before the barbarous hosts of the Mahdi. The ceremony among the ruins of Gordon's palace was one of the most impressive that could be imagined. "There were those who said the gallant Sirdar himself could hardly speak or see as at the close of the service General Hunter and the rest stepped out according to their rank and shook his hand. What wonder? He had trodden this road to Khartoum for fourteen years and he stood at the goal at last."*

As a reward for his services he was raised to the peerage as Baron Kitchener of Khartoum and received the thanks of Parliament and a grant of £30,000. His labours had been great, but Kitchener has never been long without a call being made upon his services. In 1899, while still Sirdar of the Egyptian Army, he was promoted Lieut.-General and appointed Chief of Staff to Lord Roberts in the South African War. In this capacity he served in the campaign of Paardeberg, the advance to Bloemfontein, the subsequent advance to Pretoria, and on Lord Roberts' return to England in November, 1900, he succeeded him as Commander-in-Chief, receiving at the same time the rank of General. It might have been thought that Kitchener's experiences as Commander-in-Chief in the field would have unfitted him for the duties of Chief of the Staff. This, however, was not the case. On Lord Roberts' return to England he made a speech at Southampton in which the following words occur:—"As Chief of the Staff of the Armies in South Africa, Lord Kitchener has been my right-hand man throughout the campaign, and I am glad to take this opportunity of publicly expressing how much I owe to his wise counsels and ever-ready help. No one could have laboured more incessantly or in a more self-effacing manner than Lord Kitchener has done, and no one could have assisted me more loyally without a thought of self-aggrandisement."

The war in South Africa was destined to drag on until May, 1902. Lord Kitchener tackled the problem of guerilla warfare with no less success than he had attained in solving the problem of the re-conquest of the Soudan. Nor was it only in the system of blockhouses devised by him, nor by the great drives by which he gradually wore down the Boer resistance that Kitchener displayed consummate powers. He was equally successful as a diplomatist, and the peace of Vereeniging is no less a lasting tribute to his skill and tact as a statesman than the Battle of Omdurman is to his ability as a commander in the field. On the 4th June the Secretary of State for

* Steevens' *With Kitchener to Khartoum.*

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War cabled this message to the man who had brought the long and tedious war to a satisfactory conclusion :—

"His Majesty's Government offer you their most sincere congratulations on the energy, skill and patience with which you have conducted this prolonged campaign, and would wish you to convey to the troops under your command their profound sense of the spirit of endurance with which they have met every call made upon them, of their bravery in action, and the excellent discipline preserved and of the humanity shown by them throughout this trying period."

Again Kitchener received the thanks of the British Parliament and a grant of £50,000. Before he sailed for England a banquet was given to him on the 17th June, on which occasion he thus addressed his audience—men who had taken part with him in the long struggle. What wonder that again as at Khartoum the stern leader displayed depth of feeling and emotion. "What have you learned during the War?" he said. "Some have learned to ride and shoot; all of you have learned discipline, to be strong and stedfast in the hour of danger, to attack with vigour, to hold what you have gained. You can never forget the true friends and comrades by whose side you have stood in a hundred fights. Even the hardships which you have so cheerfully endured will in the remembrance be only pleasures. Teach the youths who come after you what you have learned. Keep your rifles and horses ready, and your bodies physically fit so that you may be prepared at any time to take your due part in the great Empire which unites us all."

No less happy were his references to those who had been so long against him in the field. He dwelt on their willingness to obey implicitly the orders of their leaders; on their discipline, courage and skill both in attack and in retreat. "Whatever our previous convictions," he concluded, "we have come to realize that they are a virile race and an asset of considerable importance to the British Empire."

This soldierly appreciation of the fine qualities of the Boers—an appreciation which Kitchener had clearly shown at the Peace Conference—completely won the hearts of his former opponents. The campaign of General Botha in German South-West Africa in 1915, and that of General Smuts in German East Africa during the present year, form an eloquent tribute to the power of conciliation displayed by Lord Kitchener at the close of his great campaign in South Africa.

On his return to England he was created a Viscount, and received from the hands of King Edward the new and distinguished decoration of the Order of Merit. Again, as after the Egyptian War, Lord Kitchener was left unemployed for a very brief period. Soon after the peace he was sent to India as Commander-in-Chief. On his

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journey out he made a point of visiting Khartoum, where he had the gratification of performing the opening ceremony of the Gordon Memorial College of which he was founder and organiser. "Therewith another dream of Kitchener's was realized. The smashing of the Mahdi, Gordon's murderer, had been one dream. This, the educating of the conquered and the once oppressed people of the villages round was another. He had appealed on its behalf in the very hour of victory when he had returned home, and the substantial amount subscribed for his pet project—£120,000—was an indication of the nation's delighted admiration of his military achievement."*

The ceremony at Khartoum took place early in November, 1903, and before the end of the month Kitchener had landed in India. Here he spent the next seven years of his life. Not only did he carry out many far-reaching administrative reforms, but he also effected the complete reorganization and strategical redistribution of the British and Indian forces. An officer who knew him well during those seven years has described the intense energy and concentration with which he carried out his work. Owing to his magnificent physique he was never sick or sorry except when his leg was broken as the result of a riding accident. Even then he was like a caged lion. He worked all day in bed. His staff constantly attended for orders and instructions. He wrote little, but was a wonderful critic of all schemes submitted to him. He was a supreme judge of character, and selected his staff with unerring insight.

On leaving India in 1909 he was promoted Field Marshal, and was appointed Commander-in-Chief and High Commissioner in the Mediterranean. During this period he undertook a tour of inspection of the forces of the Empire, and went to Australia and New Zealand in order to assist in drawing up local schemes of defence. As a consequence of his report compulsory training was introduced, and the deeds of the Anzac Corps in Gallipoli are an eloquent testimony to the soundness of the principles on which Kitchener organised the Australasian forces.

In 1911 he was appointed British Agent in Egypt and thanks to his firmness and decision Egypt was kept neutral in the war that took place in that year between Italy and Turkey. His prestige in Egypt was of the highest, and although the Egyptian Army was burning to render aid to their co-religionists and to help to save Tripoli from Italian occupation, he was able by firmness and decision, backed by his known sympathies with the Moslem population, to keep Egypt free from the complications of the international situation.

During the summer of 1914 Kitchener was on leave in England,

* Groser's *Lord Kitchener.*

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and on the 3rd of June his name appeared in the list of Birthday Honours as the recipient of an Earldom. Within two months of this last mark of Royal favour—on the 4th August, 1914—war was declared by Great Britain on Germany. Lord Kitchener was on his way to resume his duties in Egypt and had reached Dover where he was about to embark. A telegram reached him on the boat and he was recalled to London. On the 5th August his appointment as Secretary of State for War was made public and the news was received with universal acclamation. Great as were the deeds Kitchener had by this time accomplished, the greatest achievement of all remained to be done. No one but a man in whose character and personality the people of Great Britain had the completest confidence could have transformed England and the Empire into a great military power. The new armies that were raised in England were popularly known as Kitchener's Armies, and history will endorse the recent statement of the Prime Minister that the credit for the raising of these armies must absolutely and entirely be given to him. On the 5th June, 1916, after 22 months of such responsibilities and labours as have rarely been undertaken and borne by any human being, he sailed with his staff on board H.M.S. *Hampshire* on a mission to the Emperor of Russia. He had not been three hours at sea before the *Hampshire* was struck by a floating mine and only 12 survivors of the crew landed alive on the Orkneys from a raft. The end was sudden and dramatic, but the work of the great Soldier-Administrator was finished. Five million men had voluntarily enlisted in the land and sea forces of the Empire; the new armies had been trained, and most of them were by this time in the field in France, in Flanders, in Egypt, at Salonika and in Mesopotamia. Others might now carry on the work. The brain and personality of the great organiser were now no longer essential to success. Like Carnot, he had organised victory, and it was for others to complete his task.

His career may be best summed up by the following message from His Majesty the King to the troops, which was issued as an Army Order on the 6th June, 1916:—

"The King has learnt with profound regret of the disaster by which the Secretary of State for War has lost his life while proceeding on a special mission to the Emperor of Russia.

"Field Marshal Lord Kitchener gave 45 years of distinguished service to the State, and it is largely due to his administrative genius and unwearying energy that the country has been able to create and place in the field the Armies which are to-day upholding the traditional glories of our Empire.

"Lord Kitchener will be mourned by the Army as a great soldier who, under conditions of unexampled difficulty, rendered supreme and devoted service both to the Army and the State."

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DEEDS OF THE ROYAL ENGINEERS.

THE ROYAL ENGINEERS AND THE VICTORIA CROSS.

THE Victoria Cross was instituted by Her Majesty the late Queen Victoria on the 29th January, 1856, in recognition of the splendid services rendered by her soldiers and sailors in the Crimean War. Long before the institution of this Cross there was much controversy on the subject, two of the strongest opponents to the innovation being the Duke of Wellington and General Gordon. The former's objection was based on the ground that there were already ample means of rewarding senior officers for meritorious services and that it was unnecessary and unsoldierlike to reward junior officers or the rank and file for bravery or special acts of devotion to duty.

General Gordon's objection was equally strong but on a different plane. He stated that in his opinion any soldier who failed to deserve the proposed decoration was unworthy of wearing the Queen's uniform and that to signalize mere opportunity by awarding a rare and coveted decoration was both illogical and undesirable.

When the details of the Crimean War became known, however, popular opinion was so strongly in favour of recognizing the numerous acts of bravery and self-sacrifice in the face of the enemy that all opposition was withdrawn and the Victoria Cross was duly instituted by Royal Warrant.

In the first Royal Warrant it is set out in the preamble that the decoration is instituted because " there exists no means of adequately rewarding the individual gallant services of either officers in the lower grades in our naval and military services, or of warrant and petty officers, seamen and marines in our Navy, and non-commissioned officers and soldiers in our Army and whereas the third class of our most Honourable Order of the Bath is limited except in very rare cases, to the higher ranks of both services, and the granting of medals both in our Navy and Army, is only awarded for long service and meritorious conduct, rather than for bravery in action, or distinction before an enemy . . . We have instituted . . . a new naval and military decoration which we are desirous should be highly prized and eagerly sought after by the officers and men of our naval and military services."

The decoration, which was designed by the Prince Consort who took a keen interest in its institution, consists of a Maltese Cross of bronze with the Royal Crest in the centre, underneath which is an escroll bearing the inscription " For Valour." The Cross is suspended from the left breast by a blue ribbon for the Navy and by a red

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ribbon for the Army. A register is kept by the Secretary of State for War of all those who obtain the decoration. The following further details and conditions are quoted from the Royal Warrant instituting the Victoria Cross :—

"Anyone who after receiving the decoration, again performs an act of bravery which if he had not received such Cross would have entitled him to it shall receive a bar attached to the ribbon by which the Cross is suspended. The Cross shall only be awarded to those officers and men who have served in the presence of the enemy and shall have then performed some signal act of valour or devotion to their country. Neither rank, nor long service, nor wounds, nor any other circumstance or condition whatsoever, save the merit of conspicuous bravery shall be held to establish a sufficient claim to the honour.

"Every warrant officer, petty officer, seaman or marine or non-commissioned officer or soldier who shall have received the Cross shall be entitled to a special pension of ten pounds a year and each additional Bar shall carry with it an additional pension of five pounds a year.

"To preserve pure this most honourable distinction it is ordained that if any person on whom such distinction shall be conferred, be convicted of treason, cowardice, felony or of any infamous crime, or if he be accused of any such offence and doth not after a reasonable time surrender himself to be tried for the same, his name shall be forthwith erased from the registry of individuals upon whom the said decoration shall have been conferred."

Under a Royal Warrant dated 1st January, 1867, the conditions were extended to include local forces serving with regular troops under the orders of a general or other officer, under circumstances which would entitle an officer or soldier of the regular army to be recommended for the decoration.

The Royal Warrant dated 23rd April, 1881, reiterates the condition that the qualification shall be "conspicuous bravery or devotion to the country in the presence of the enemy" and extends the scope to include Auxiliary and Reserve Forces both naval and military.

By Royal Warrant dated 6th August, 1881, the conditions were further extended to include members of the Indian Ecclesiastical Establishments who although not receiving military commissions are liable to be attached to an army in the field.

A Royal Warrant dated 21st October, 1911, again extended the conditions and rendered native officers, non-commissioned officers and men of the Indian Army eligible for the decoration but the pension conferred under the original Royal Warrant is in these cases to be 525 rupees a year with 150 rupees a year for each additional Bar for commissioned officers, and 150 rupees a year with 75 rupees a year for each additional Bar for non-commissioned officers or soldiers.

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In 1898 the amount of the pension payable to non-commissioned officers and men (not Indian Army) was increased to £50 per annum "in respect of those who from old age, or infirmity not due to their own fault, may be in poor circumstances and unable to earn a living."

The first batch gazetted to the new decoration on 24th February, 1857, numbered 85 of whom 27 belonged to the Navy. The Royal Engineers obtained 5, the Cavalry 4, the Royal Artillery 3, Foot Guards 11 and the Infantry 35.

A short description of this first presentation of the decoration may be of interest. The ceremony of inauguration took place in the presence of representative forces of the Army and Navy, assembled in Hyde Park on Friday, the 26th June, 1857, and was a magnificent spectacle. The Queen, mounted and in a scarlet jacket, accompanied by Prince Albert, Prince Frederick William of Prussia (afterwards German Emperor), with the Prince of Wales and Prince Alfred, afterwards Duke of Edinburgh and Saxe-Coburg-Gotha, and attended by a brilliant suite, personally decorated 62 officers, warrant officers, non-commissioned officers and men with the Cross, with her own hand pinning it on the breast of each recipient. The band of heroes then formed line facing Her Majesty and her suite, and the head-quarters staff and the troops marched past between them.

Lieut. Graham, R.E. (afterwards Lieut.-General Sir Gerald Graham, V.C., G.C.B., whose Cross is now in the R.E. Museum), was one of the five R.E.'s in this first batch and his exploit is duly chronicled, with that of the other heroic Royal Engineers, at the end of this chapter. Graham wrote the following letter to his father after it was over :—

"CAMP, ALDERSHOT, 30*th June*, 1857.

"MY DEAR FATHER,

. . . We were formed in line and then advanced singly to the Queen, who remained on horseback. She pinned on the medal (Cross) with her own hand to our coats. She stuck the pin fairly into me, so that I keenly realized my momentary interview with Royalty. . . .—Ever, etc., G. GRAHAM."

From the date of its institution up to the outbreak of the present War 522 Victoria Crosses had been awarded and the numbers obtained by the various branches of the Services are approximately as follows :—Infantry, 275 ; Cavalry, 82 ; Royal Navy, 41 ; Royal Artillery, 30 ; Royal Engineers, 27 ; Staff Corps, 16 ; Foot Guards, 13 ; Army Medical Services, 11 ; Bengal Artillery, 11 ; Bengal Ordnance, 2 ; Bengal Veteran Establishment, 2 ; Bengal Civil Service, 2 ; Tasmanian Imperial Bushmen, 2 ; Royal Marine Light Infantry, 2 ; Royal Marine Artillery, 2 ; Indian Medical Establishment, 1 ; Commissariat, 1 ; Assistant Commissioner for Oudh, 1 ; total, 522.

It will be seen that the Royal Engineers obtained 27 out of 480 awarded to the Army.

During the present War, however, 90 Victoria Crosses have so far been awarded and of these no less than 10 have been bestowed on

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Royal Engineers. An extraordinarily high proportion especially when it is borne in mind what a comparatively small body the Corps presents in the national forces, which now consist of many millions of men who have been engaged for over two years in most desperate fighting on land and sea in all parts of the globe.

The Royal Engineers have up to date won 37 Victoria Crosses and the gallant deeds that secured these coveted decorations are detailed as follows :—

Crimea, 1854—1856.

LENNOX, LIEUT. W. O.—"Cool and gallant conduct in establishing a lodgment in Tyron's Rifle Pit, and assisting to repel the assaults of the enemy. This brilliant operation drew forth a special order from General Canrobert."—*London Gazette*, 24th February, 1857.

LENDRIM, Corpl. W. J. (No. 1078).—"Intrepidity—getting on the top of a magazine and extinguishing sandbags which were burning, and making good the breach under fire, on April 11th, 1855. For courage and praiseworthy example in superintending 150 French Chasseurs on February 14th, 1855, in building No. 9 Battery, Left Attack, and replacing the whole of the capsized gabions under heavy fire. Was one of the four volunteers for destroying the farthest rifle pit, on April 20th."—*London Gazette*, 24th Feb., 1857.

MCDONALD, Col.-Sergt. H.—"For gallant conduct when engaged in effecting a lodgment in the Enemy's Rifle Pits in front of the Left Advance of the Right Attack on Sebastopol and for subsequent valour when, by the Engineer officers being disabled from wounds, the command devolved upon him, and he determinately persisted in carrying on the sap, notwithstanding the repeated attacks of the enemy. April 19th, 1855."—*London Gazette*, 2nd June, 1858.

ELPHINSTONE, Capt. H. C.—"For fearless conduct, in having, on the night after the unsuccessful attack on the Redan, volunteered to command a party of volunteers, who proceeded to search for and bring back the scaling ladders left behind after the repulse ; and while successfully performing this task of rescuing trophies from the Russians, conducted a persevering search, close to the enemy, for wounded men, twenty of whom he rescued and brought back to the trenches."—*London Gazette*, 2nd June, 1858.

GRAHAM, LIEUT. G.—"Determined gallantry at the head of a ladder party, at the assault of the Redan, on the 18th June, 1855. Devoted heroism in sallying out of the trenches on numerous occasions, and bringing in wounded officers and men."—*London Gazette*, 24th Feb., 1857. (This Cross is now in the R.E. Museum, Chatham).

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LEITCH, Col.-Sergt. P.—"For conspicuous gallantry in the assault on the Redan, when, after approaching it with the leading ladders, he formed a caponnière across the ditch, as well as a ramp, by fearlessly tearing down gabions from the parapet, and placing them and filling them until he was disabled from wounds. 18th June, 1855."—*London Gazette*, 2nd June, 1858.

PERIE, Sapper J. (No. 854).—"Conspicuous valour in leading the sailors with the ladders to the storming of the Redan on June 18th, 1855. He was invaluable on that day. Devoted conduct in rescuing a wounded man from the open, although he himself had just previously been wounded by a bullet in the side."—*London Gazette*, 24th Feb., 1857.

(This Cross, and the French medal for valour—awarded to Perie—is now in the R.E. Museum).

ROSS, Corpl. John (No. 997).—"Distinguished conduct on July 21st, 1855, in connecting the 4th Parallel Right Attack with an old Russian Rifle Pit in front. Extremely creditable conduct on August 23rd, 1855, in charge of the advance from the 5th Parallel Right Attack on the Redan in placing and filling 25 gabions under a very heavy fire, whilst annoyed by the presence of light balls. Intrepid and devoted conduct in creeping to the Redan in the night of September 8th, 1855, and reporting its evacuation, on which its occupation by the English took place."—*London Gazette*, 24th Feb., 1857.

Indian Mutiny, 1857—1859.

HOME, Lieut. D. C., SALKELD, Lieut. P. (Bengal Engineers). (Upon whom the Victoria Cross was provisionally conferred by Major-General Sir Archdale Wilson, Bart., K.C.B.).—"For their conspicuous bravery in the performance of the desperate duty of blowing in the Cashmere Gate of the Fortress of Delhi, in broad daylight, under a heavy fire of musketry, on the morning of the 14th September, 1857, preparatory to the assault. Would have been recommended to Her Majesty for confirmation in that distinction had they survived."—*London Gazette*, 18th June, 1858.

SMITH, Sergt. J. (Bengal S. & M.).—"For conspicuous gallantry in conjunction with Lieuts. Home and Salkeld, in the performance of the desperate duty of blowing in the Cashmere Gate of the Fortress of Delhi in broad daylight, under a heavy and destructive fire of musketry, on the morning of the 14th September, 1857, preparatory to the assault."—*London Gazette*, 24th April, 1858.

THACKERAY, Lieut. E. T. (Bengal Engineers).—"For cool intrepidity and characteristic daring in extinguishing a fire in the Delhi magazine enclosure on September 16th, 1857

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under a close and heavy musketry fire from the enemy, at the imminent risk of his life from the explosion of combustible stores in the shed in which the fire occurred."—*London Gazette*, 29th April, 1862.

PRENDERGAST, Lieut. H. N. D. (Madras Engineers).—"For conspicuous bravery on the 21st November, 1857, at Mundisore, in saving the life of Lieut. G. Dew, 14th Light Dragoons, at the risk of his own, by attempting to cut down a Velaitee who covered him (Lieut. Dew) with his piece, from only a few paces to the rear. Lieut. Prendergast was wounded in this affair by the discharge of the piece, and would probably have been cut down had not the rebel been killed by Major Orr.

"He also distinguished himself by his gallantry in the actions at Ratgurh and Betwa, when he was severely wounded.

"Major-General Sir Hugh Rose, in forwarding his recommendation of this officer, states:—

"'Lieut. Prendergast, Madras Engineers, was specially mentioned by Brigadier, now Sir Charles, Stuart, for the gallant act at Mundisore, when he was severely wounded; secondly, he was "specially mentioned" by me when acting voluntarily as my A.D.C. in the action before Nesilging, Ratgurh, on the Beena River, for gallant conduct. His horse was killed on that occasion. Thirdly, at the action of the Betwa, he again voluntarily acted as my A.D.C., and distinguished himself by his bravery in the charge which I made with Capt. Need's troop, H.M. 14th Light Dragoons, against the left of the so-called Peishwa's Army under Tantia Topee. He was severely wounded on that occasion.'"—*London Gazette*, 21st Oct., 1859.

INNES, Lieut. J. J. McL. (Bengal Engineers).—"At the action at Sultanpore, Lieut. Innes, far in advance of the leading skirmishers, was the first to secure a gun which the enemy were abandoning. Retiring from this, they rallied round another gun farther back, from which the shot would in another instant have ploughed through our advancing columns, when Lieut. Innes rode up, unsupported, shot the gunner who was about to apply the match, and remaining undaunted at his post, the mark for a hundred matchlock men who were sheltered in some adjoining huts, kept the artillerymen at bay, until assistance reached him." (Letter from Major-General Thomas Harte Franks, K.C.B., of 12th March, 1858).—*London Gazette*, 24th December, 1858.

SLEAVON, Corpl. M. (21st Co.).—"For determined bravery at the attack of the Fort at Jhansi, on April 3rd, 1858, in main-

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taining his position at the head of a sap, and continuing the work under a heavy fire with a cool and steady determination worthy of the highest praise."—*London Gazette*, 11th November, 1859.

GOODFELLOW, Lieut. C. A. (Bombay Engineers).—" For gallant conduct at the attack on the Fort at Beyt, on 6th October, 1859; on that occasion a soldier of the 28th Regiment was shot under the walls of the Fort; Lieut. Goodfellow rushed under the walls under a sharp fire of matchlocks, and bore off the body of the soldier, who was then dead, but whom he at first supposed to be wounded only."—*London Gazette*, 16th April, 1863.

Bhootan, 1865.

TREVOR, Major W. S., DUNDAS, Lieut. J.—" For their gallant conduct at the attack on the Blockhouse at Dewangiri, in Bhootan, on 30th April, 1865. Major-General Tombs, C.B., V.C., the officer in command at the time, reports that a party of the enemy, from 180 to 200 in number, had barricaded themselves in the Blockhouse in question, which they continued to defend after the rest of the position had been carried, and the main body was in retreat. The Blockhouse which was loopholed, was the key of the enemy's position.

" Seeing no officer of the storming party near him, and being anxious that the place should be taken immediately, as any protracted resistance might have caused the main body of the Bhooteas to rally, the British force having been fighting in a boiling sun on very steep and difficult ground, for upwards of three hours, the General in command ordered these two officers to show the way into the Blockhouse. They had to climb up a wall which was 14 ft. high, then to enter a house occupied by some 200 desperate men, head foremost, through an opening not more than 2 ft. wide between the top of the wall and the roof of the Blockhouse. Major-General Tombs states that, on speaking to the Sikh soldiers round him, and telling them in Hindostani to swarm up the wall, none of them responded to the call, until these two officers had shown them the way, when they followed with the greatest alacrity. Both of them were wounded."—*London Gazette*, 31st December, 1867.

Ashanti, 1873—1874.

BELL, Lieut. M. S.—" For his distinguished bravery and zealous, resolute, and self-devoted conduct at the Battle of Ordahsu, on the 4th February, 1874, whilst serving under the immediate orders of Colonel Sir John Chetham McLeod, K.C.B., of the 42nd Regiment, who commanded the advanced

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guard. Sir John McLeod was an eyewitness of his gallant and distinguished conduct on the occasion, and considers that this officer's fearless and resolute bearing, being always in the front, urging on and encouraging an unarmed working party of Fantee labourers, who were exposed not only to the fire of the enemy, but to the wild and irregular fire of the native troops in the rear, contributed very materially to the success of the day. By his example, he made these men do what no European party was ever required to do in warfare, namely, to work under fire in the face of the enemy without a covering party."—*London Gazette*, 20th November, 1874.

Zululand, 1878—1880.

CHARD, Lieut. J. R. M. * * * —"For their gallant conduct at the Defence of Rorke's Drift, on the occasion of the attack by the Zulus, on the 22nd and 23rd January, 1879. The Lieut.-General commanding the troops reports that, had it not been for the fine example and excellent behaviour of these two officers under the most trying circumstances, the Defence of Rorke's Drift post would not have been conducted with that intelligence and tenacity which so essentially characterized it. The Lieut.-General adds that its success must in a great degree be attributable to the two young officers who exercised the chief command on the occasion in question."—*London Gazette*, 2nd May, 1879.

Afghanistan, 1878—1880.

HART, Lieut. R. C.—"For his gallant conduct in risking his own life in endeavouring to save the life of a private soldier.

"The Divisional General commanding the 2nd Division Peshawar Field Force, reports that when on convoy duty with that force on the 31st January, 1879, Lieut. Hart, of the Royal Engineers, took the initiative in running some 1,200 yards to the rescue of a wounded Sowar of the 13th Bengal Lancers in a river bed exposed to the fire of the enemy, of unknown strength, from both flanks, and also from a party in the river-bed. Lieut. Hart reached the wounded Sowar, drove off the enemy, and brought him under cover with the aid of some soldiers who accompanied him on the way."—*London Gazette*, 10th June, 1879.

LEACH, Capt. E. P.—"For having in action with the Shinwarris, near Maidanah, Afghanistan, on the 17th March, 1879, when covering the retirement of the survey escort who were carrying Lieut. Barclay, 45th Sikhs, mortally wounded, behaved with the utmost gallantry in charging, with some men of the 45th Sikhs, a very much larger number of the enemy. In this encounter Capt. Leach killed two or three of

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the enemy himself, and he received a severe wound from an Afghan knife in the left arm. Capt. Leach's determination and gallantry in this affair, in attacking and driving back the enemy from the last position, saved the whole party from annihilation."—*London Gazette*, 6th Dec., 1879.

Hunza-Nagar, 1891.

AYLMER, Capt. F. J.—" For his conspicuous bravery in the assault and capture of the Nilt Fort, on 2nd December, 1891. This officer accompanied the storming party, burst open the inner gate with guncotton, which he placed and ignited, and though severely wounded, once in the leg and twice in the right hand, fired nineteen shots with his revolver, killing several of the enemy, and remained fighting, until, fainting from loss of blood, he was carried out of action."—*London Gazette*, 12th July, 1892.

North-West Frontier, 1897—1898.

WATSON, Lieut. T. C.—" This officer, on the 16th September, 1897, at the village of Bilot, in the Mamund Valley, collected a few men of the Buffs (East Kent Regt.) and of No. 4 Co., Bengal S. & M., and led them into the dark and burning village to dislodge some of the enemy who were inflicting loss on our troops. After being wounded and driven back, he made a second attempt to clear the village, and only desisted after a second repulse and being again hit and severely wounded."—*London Gazette*, 20th May, 1898.

COLVIN, Lieut. J. M. C.—" On the same occasion, after Lieut. Watson had been incapacitated by his wounds from further effort, Lieut. Colvin continued the fight and persisted in two more attempts to clear the enemy out of the dark and still burning village. He was conspicuous during the whole night for his devotion to his men in the most exposed positions under a heavy fire from the enemy."— *London Gazette*, 20th May, 1898.

South Africa, 1899—1902.

JONES, Lieut. R. J. T. D.—" Would have been recommended for the Victoria Cross had he survived, on account of his having, during the attack on Waggon Hill (Ladysmith) of the 6th January, 1900, displayed conspicuous bravery and gallant conduct in leading the force which reoccupied the top of the hill at a critical moment just as the three foremost attacking Boers reached it, the leader being shot by Lieut. Jones and the two others by Trooper Albrecht." *London Gazette*, 8th August, 1902.

KIRBY, Corpl. F. H.—" On the morning of 2nd June, 1900, a party sent to try and cut the Delagoa Bay Railway were retiring,

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hotly pressed by very superior numbers. During one of the successive retirements of the rear guard, a man whose horse had been shot was seen running after his comrades. He was a long way behind the rest of his troop, and was under a brisk fire. From among the retiring troop, Corpl. Kirby turned and rode back to the man's assistance. Although by the time he reached him they were under a heavy fire at close range, Corpl. Kirby managed to get the dismounted man up behind him, and to take him clear over the next rise held by our rear guard. This is the third occasion on which Corpl. Kirby has displayed gallantry in the face of the enemy."—*London Gazette*, 5th October, 1900.

European War, 1914—

WRIGHT, Capt. T.—"Gallantry at Mons on 23rd August, 1914, in attempting to connect up the lead to demolish a bridge under heavy fire; although wounded in the head he made a second attempt. At Vailly on 14th September, he assisted the passage of the 5th Cavalry Brigade over the pontoon bridge, and was mortally wounded while assisting wounded men into shelter."—*London Gazette*, 16th Nov., 1914.

JARVIS, Lce.-Corpl. C. A. (No. 3976), 57th Field Co.—"For great gallantry at Jemappes on 23rd August, in working for 1½ hours under heavy fire in full view of the enemy, and in successfully firing charges for the demolition of a bridge."—*London Gazette*, 16th Nov., 1914.

JOHNSTON, Capt. W. H.—"At Missey, on 14th Sept., under a heavy fire all day until 7 p.m. worked with his own hand two rafts, bringing back wounded and returning with ammunition, thus enabling advanced brigade to maintain its position across the river."—*London Gazette*, 25th Nov., 1914.

NEAME, Lieut. P.—"For conspicuous bravery on 19th Dec., near Neuve Chapelle, when, notwithstanding the very heavy rifle fire and bomb throwing by the enemy, he succeeded in holding them back, and rescuing all the wounded men whom it was possible to move."—*London Gazette*, 18th Feb., 1915.

MARTIN, Lieut. C. G., D.S.O.—"For most conspicuous bravery at Spanbroek Molen on 12th March, 1915, when in command of a grenade-throwing party of six rank and file. Although wounded early in the action, he led his party into the enemy's trenches and held back their reinforcements for nearly 2½ hours, until the evacuation of the captured trench was ordered."—*London Gazette*, 19th April, 1915.

JOHNSON, Temp. Sec. Lieut. F. H.—"For most conspicuous bravery and devotion to duty in the attack on Hill 70, on 25th Sept., 1915. Sec.-Lieut. Johnson was with a section of his company of the R.E. Although wounded in the leg, he stuck to his duty

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throughout the attack, led several charges on the German redoubt, and at a very critical time, under very heavy fire, repeatedly rallied the men who were near him. By his splendid example and cool courage, he was mainly instrumental in saving the situation and in establishing firmly his part of the position which had been taken. He remained at his post until relieved in the evening."—*London Gazette*, 18th Nov., 1915.

DAWSON, Corpl. J. L. (No. 91608), 187th Co.—"For most conspicuous bravery and devotion to duty on 13th October, 1915, at Hohenzollern Redoubt. During a gas attack, when the trenches were full of men, he walked backwards and forwards along the parados, fully exposed to a very heavy fire, in order to be the better able to give directions to his own Sappers, and to clear the infantry out of the sections of the trench that were full of gas. Finding three leaking gas cylinders, he rolled them some 16 yards away from the trench again under very heavy fire, and then fired rifle bullets into them to let the gas escape. There is no doubt that the cool gallantry of Corpl. Dawson on this occasion saved many men from being gassed."—*London Gazette*, 7th Dec., 1915.

HAWKER, Capt. L. G., D.S.O. (R.E. and R.F.C.).—"For most conspicuous bravery and very great ability on 25th July, 1915. When flying alone he attacked three German aeroplanes in succession. The first managed eventually to escape, the second was driven to ground damaged, and the third, which he attacked at a height of about 10,000 ft., was driven to earth in our lines, the pilot and observer being killed. The personal bravery shown by this officer was of the very highest order, as the enemy's aircraft were armed with machine guns, and all carried a passenger as well as a pilot."—*London Gazette*, 24th Aug., 1915.

BASSETT, Corpl. C. R. G. (No. 4/515), New Zealand Divisional Signal Co.—"For most conspicuous bravery and devotion to duty on the Chunuk Bair Ridge in the Gallipoli Peninsula on 7th August, 1915.

"After the New Zealand Infantry Brigade had attacked and established itself on the ridge, Corpl. Bassett, in full daylight and under a continuous and heavy fire, succeeded in laying a telephone line from the old position to the new one on Chunuk Bair. He has subsequently been brought to notice for further excellent and most gallant work connected with the repair of telephone lines by day and night under heavy fire."—*London Gazette*, 15th October, 1915.

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HACKETT, Sapper W. (No. 136414).—"For most conspicuous bravery when entombed with four others in a gallery owing to the explosion of an enemy mine. After working 20 hours, a hole was made through fallen earth and broken timber and the outside party was met. Sapper Hackett helped three of the men through the hole and could easily have followed, but refused to leave the fourth, who had been seriously injured, saying, 'I am a tunneller; I must look after the others first.' Meantime the hole was getting smaller yet he still refused to leave his injured comrade. Finally the gallery collapsed and though the rescue party worked desperately for four days the attempt to reach the two men failed. Sapper Hackett well knowing the nature of sliding earth, the chances against him, deliberately gave his life for his comrade."—*London Gazette*, 5th August, 1916.

In concluding this chapter it is only right to remember—to quote the words of Gray's Elegy—that

"Full many a gem, of purest ray serene,
The dark unfathom'd caves of ocean bear:
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air."

Not all the gallant deeds of the Royal Engineers are chronicled in this brief story of the Victoria Cross. It is a commonplace saying that for every Victoria Cross awarded at least a hundred are deserved. The history of the Corps is replete with acts of heroism and extraordinary devotion to duty, but the recorded instances do not represent a tithe of the full list of the gallant achievements of our comrades and predecessors in the Royal Engineers.

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THE FUTURE OF FORTS.

By GENERAL BERTHAUT.*

Engineering publishes the following:—In several Paris papers a somewhat animated discussion has taken place as to the value of permanent fortifications. Certain writers have dwelt on the fact that in the present War, many fortresses have offered an inadequate resistance or none at all, in order to prove that permanent fortification is a thing of the past, being no longer suited to play any useful part. The logical outcome of this view would be to insist on the abandonment and demolition of all fortresses. The question is important enough to deserve careful investigation, and doubtless this investigation will be made at the end of the War when we have the time and the freedom from preoccupation which are necessary for prolonged research. It may, however, be interesting even at the present stage to submit some thoughts on this subject.

We may begin with the obvious remark that when an instrument is inadequate for its purpose, the remedy is not to destroy it, but to make it better. It is well, therefore, to consider whether improvement and modifications can be made which will give permanent fortifications that solidity which they now seem to lack. It is only when this has been proved to be impossible that we shall be justified in proceeding to their destruction.

Those who do not favour fortresses point out that, in spite of vaulted chambers, casemates and cupolas, the forts around Liège

* General Henri Berthaut, the author of this article, was educated at St. Cyr and at the school of the General Staff, leaving the latter with the rank of Lieutenant, when war was declared in 1870. He continued to serve until 1876, when he was summoned to the General Staff as Captain, in which capacity he carried out his duties until 1884. Later he was attached to the Japanese Army as Director of Manœuvres and Professor of Tactics and Strategy from 1884 to 1889. On his return to France in 1889 Major Berthaut rejoined the General Staff, devoting his attention particularly to military geography. He wrote a number of important works on this subject, which were published by the Government:—*La Carte de France, Ingenieurs Geographes Militaires*, and *La Topologie*. Between 1889 and 1912 when he retired, he was successively Colonel, Brigadier-General, Director of the Geographical Service, and Major-General.

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resisted only a very short time and only slightly checked the German invasion; that those of Namur were even less effective; that the entrenched camp of Antwerp, with its double line of works, was equally wanting in strength. So much for Belgium—although the fortifications had all been constructed by Colonel Brialmont, one of the most distinguished military engineers of our times.

In France, Maubeuge was reduced to silence in a few days; Lille was not even defended. As for the entrenched camps of Rheims and Laon, they were simply ignored. The Germans passed through them unchecked, after our retreat from Charleroi; they returned to them after their defeat on the Marne.

The same critics of the fortress further remark that not a single cannon has been fired from Belfort, Epinal, and Toul since the beginning of the War, and that these are indeed protected by our troops, whose present lines are considerably in advance of them.

Turning to the theatre of war in Russia, the same writers emphasize the rapid fall of such fortresses as Novo-Georgiewsk, Brest-Litovsk, and Kovno. They seem, however, to overlook that Ossowietz held up the Germans for many months, that Dwinsk offered an energetic resistance to their most furious attacks, and that Przemysl, though completely invested, only capitulated because there was no food left for the garrison and the inhabitants of that town.

There are, then, some fortresses which resist for a long time, and play a very important part in war, while others seem to disappoint all the hopes that have been set on them. How can this be explained?

In the first place, we must realize that the science of fortification has not reached finality any more than other sciences. At any particular time it conforms with certain conditions, and these keep on changing. A fortification must be so devised that it will resist, as fully as possible, the means employed in attack; and if these are changed it must undergo a corresponding change. Its evolution is determined by the progress in the instruments of attack. The old-time fortified castles with their lofty walls, dominating the district and visible from afar, served their purpose very well until cannons succeeded in shattering them. Then it became necessary to seek fresh means of defence.

Lofty walls gave place to walls that were invisible, protected by thick embankments of earth. Instead of towers there were bastions, as designed by Vauban and his school. When, owing to further improvements in artillery, bastions were no longer found to be effective, another system was adopted, known as the polygonal, which again underwent numerous modifications, between 1815 and 1859, the date of the first appearance of rifled guns. Since the war of 1870 the nature of permanent fortifications has changed again, owing to the invention of high-explosive shells of ever-increasing power. So rapid have been the advances in the construction of cannons and

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in the force of explosives, in the most recent period, that the science of fortification has necessarily been outdistanced.

Fortified works betray the date of their construction. Doubtless they can be strengthened and improved up to a certain point; still, their general design is of definite type, and if that type no longer corresponds to what is required, nothing remains but to demolish the fortress and build another.

Some years after the war of 1870 I took part in a staff journey on our frontier for purposes of study, conducted by the Chief of the General Staff. One day we were visiting a fort that had been quite recently built. The captain of Engineers who had superintended its construction was explaining it to us; he remained by the side of the Chief of the General Staff in order to supply such information as might be desired. On reaching the edge of a stonework ditch, the General stopped and, turning to the Engineer officer, asked: "How deep do you make your ditch?" "Eight metres; that is the regulation depth." "But are you sure that the storming ladders of the Germans are not more than eight metres long?" The officer replied with a smile: "I venture to suggest that it will always remain easier for the Germans to lengthen their ladders than for me to deepen my ditch."

This simple remark gives the whole matter in a nutshell. A time comes when all the devices of the engineer to improve his constructions become vain. The rivalry between the means of attack and those of defence is here the same as in the domain of naval construction. When an armoured vessel has been built to resist a certain means of attack, there is no way in which it can be adapted to resist other more powerful means of attack, the result of fresh inventions. The designs of warships are continually changing; although in the case of both the underlying principles remain the same.

It is, however, not merely the actual fortification of a fortress that has to be considered. In order to estimate its value at any particular moment, we must also know how it is armed and provisioned; and lastly, we must understand what part it may usefully play in the plan of operations, in which after all it is only a detail. This plan of operations is not indeed confined to the defence of any one particular point. To be sure, fortresses are erected at points of strategic importance, such as the crossing of a big river, a place where rivers meet, railway junctions, etc. They occupy positions where it is necessary or at least important for the enemy to be checked; that is the very purpose of their construction. Nevertheless, the fact remains that the part they play and the use to which they are put depend on considerations quite apart from them, which determine the degree of their importance at any particular stage of the war.

Liège at first made a very good stand against the German attacks. But its cupolas and the concrete work of its forts were not substan-

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tial enough to withstand for long the formidable projectiles of the heavy guns or the new explosives, far more powerful than anything that was known at the time when these forts were constructed. Moreover, Liège was not supplied with artillery heavy enough to oppose that of the enemy; and the town itself was not protected by enclosing walls. It was occupied by the Germans while the forts were still holding out but could no longer hinder the passage of the Meuse, which was carried out by way of the town.

The Liège forts offered an heroic resistance, and General Leman covered himself with glory. It was different with the forts of Namur, the reason being that Namur was attacked after Liège, and that the example of Liège had shown resistance to be useless, under identical conditions. Besides, as the obstacle of the Meuse had already been overcome at Liège, there was no useful part that Namur could play. Antwerp yielded very soon, and for the same reasons. The fact is that Belgium as a neutral state and relying on the sanctity of treaties, had not deemed it necessary to pay any attention to the old-fashioned character of its fortress and the inadequacy of their artillery. Belgium had not mobilized her army, and possessed only a small supply of ammunition for her guns.

To some extent this also applies to our fortresses in the north of France. Our northern frontier was sheltered by the neutrality of Belgium. Maubeuge, at the beginning of the War, was not properly supplied with guns. As for Lille, it was not capable of defence, owing to the considerable growth of its population and the consequent building over of its environs. The industrial towns of Roubaix and Tourcoing, with all the villages lying between, now form an uninterrupted whole, in which country roads have become streets and the forts of Lille have been submerged in a sea of houses.

Most generals would have defended Rheims and Laon after the retreat from Charleroi. To abandon them was a brilliant stroke of genius on the part of General Joffre; by withdrawing yet more, as far as the Seine, he made possible the turning movement of the Paris and Verdun armies on the two flanks of the German Army. At this point, it was manifest that, although the entrenched camps of Paris and Verdun were not called upon to fire a single shot, by their very existence these camps played a part of the first importance and contributed very effectively to the victory. That alone would demonstrate that fortifications still have their use.

The Russian fortresses have also done useful work whenever they have been included in the line of battle, even though the artillery was less powerful than that of the enemy and less well supplied with shells. But when the Russians withdrew, to prolong the resistance of these fortresses, left in isolation, would have meant uselessly sacrificing the garrisons of these fortresses, since the enemy had passed round them.

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Since September, 1914, we have been facing the Germans all along the immense line extending from Nieuport to Switzerland. We occupy trenches, as they do opposite us, which are being constantly strengthened as far as possible on both sides. These entrenchments, though much less solid than permanent fortifications, offer resistance until they are demolished, or rendered useless by an enormous mass of projectiles. How could anyone assume that works constructed in peace time, with all the resources at the disposal of the engineer's industry and science, would have less power to resist? Would the suggestion not have seemed absurd?

If fortresses have not proved to be as strong as is essential, that is not the real reason why some of them have offered so brief a resistance; it is rather because, as compared with the attacking forces, their artillery was insufficient and they had an inadequate supply of shells. Make the defending batteries as strong as those that attack, make the conditions equally favourable, and they will certainly prove superior, since they have the advantage of being able to choose the most favourable positions for the guns, and of being much better and more solidly constructed.

The objection may be raised that the attacking force is fully aware in advance of the exact place occupied by the object to be attained, while the defence has to ascertain where the attacking batteries are before being able to counter-attack. That is so; but it has always been the case, and it is of less importance now than formerly, since aviation affords very rapid means of locating an attacking battery; and the possibilities of aviation are far from being exhausted.

There is another consideration which is very important to bear in mind. Hitherto, fortresses have been towns, often large towns, just because towns are built at points where natural roads converge and because the junctions of railway lines are the stations of these large towns. When a town occupies a strategic point, the fortress has the double duty of guarding this strategic point and of securing the town from the attack of the enemy. But it may happen that, instead of affording protection, it becomes a source of danger for the town and may lead to its loss. It attracts the lightning. In view of the terrible effects now caused by long-distance bombardment, it is certainly preferable to erect fortresses away from towns, and to make them serve exclusively military purposes.

I do not presume to indicate here how fortresses should be constructed, to sketch their elevations and their ground plan. That requires long and elaborate study and will be worked out after the War by the most competent military engineers. I content myself with expressing the following opinion, which I do not believe to be open to contradiction:—

It has been shown to be possible, in active warfare, to construct

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effective shelters for the troops and solid batteries, with firm platforms for very heavy guns of great calibre, which fire projectiles of enormous weight and shake the substructure very powerfully. It has been shown by experience, both on our side and on the enemy's, that these formidable machines, in spite of their weight and bulk, can be moved about, being transported either on rails or even on ordinary roads by means of traction engines. All that can be done in this way in the course of operations on ground not specially selected and not prepared, can be still better done on foundations chosen and prepared in peace time, on roads and lines laid for this purpose, by employing all such resources as are not available on the field of battle and without exposing oneself to danger or running any risks. It is therefore possible to render the defence at least as strong as the attack, if not superior to it, by furnishing it with artillery at least equally formidable and by perfecting the installation and the mobility of this material.

I come to this conclusion : permanent fortification is by no means doomed. It has done great service, it does so now, and will continue to do so. It must be transformed, not abolished. It must keep on developing, as it has been developing since ancient times ; and probably its coming development will not be final. As long as there is progress in the means of attack, the means of defence will likewise progress ; it must come about, and it can be achieved.

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THE DESIGN OF CONTINUOUS BEAMS.

MR. EWART S. ANDREWS, B.SC. (Engineering), Lond., recently read a paper on the above subject before the Society of Engineers, and the following is an abstract :—

A continuous beam is one which rests on more than two supports and is classified as " a statically indeterminate structure because the stresses in it cannot be obtained by an application of the laws of graphic statics only ; a consideration of the deflected form of the beam is also necessary. The disadvantages which have been urged against continuous beams by practical engineers in the past will probably disappear as further experience is obtained in their design.

The Theorem of Three Moments gives a relation between the negative bending moments at three successive supports of a continuous beam, from which, in any given case, these bending moments can be obtained ; by combining the free bending moment diagrams and the support bending moment diagrams the bending moment at any point can be found, and the reaction can be readily computed.

A numerical example of the calculations for a continuous beam of three spans is given, together with an explanation of the treatment to be adopted when one of the ends of the beam is fixed.

Tables are given of bending moment and reaction coefficients for uniformly loaded continuous beams of equal spans varying in number from two to nine.

Winkler's diagrams for two, three, and four equal spans carrying live and dead loads are given, from which the maximum positive and negative bending moments at any point of the span may be readily computed. Turneare and Maurer's coefficients for the maximum positive and negative bending moments at mid-spans and supports for equal spans from two to seven are given, together with approximate results which are sufficiently accurate in many cases for practical design.

Isolated loads on continuous beams of two equal spans are then considered and explained by the aid of a numerical example.

The paper concludes with the full calculations of the bending

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moments and shears for a warehouse floor framed with continuous beams. The external secondary beams carry greater loads than the internal ones on account of the continuous construction of the floor slabs, and diagrams of maximum positive and negative bending moments for loaded and unloaded conditions are given. The maximum and minimum reactions from the secondary beams form point loads upon the main beams for the loaded and unloaded conditions respectively; the resulting bending moments, combined with those due to the weight of the beam itself are plotted upon a diagram from which the detail design of the beam can be completed.

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REVIEWS.

PAGES D'HISTOIRE, 1914—1915.

(Librairie Militaire Berger-Levrault, Paris : 5, Rue des Beaux-Arts).

The first notice of the volumes of the *Pages d'Histoire*, 1914, series appeared in the *R.E. Journal* for February, 1915 ; in that and in subsequent numbers of the *Journal* reviews have already been published of the first 55 volumes belonging to this series, the last of them in the number for December, 1916.

A very large number of volumes of this series have recently come to hand ; it is not possible to deal with the whole of them in a single notice, and they will therefore be dealt with in suitable batches.

The 56th, 59th, 60th, and 70th numbers deal with the Mentions in Despatches, and the Awards of the Legion of Honour and the Médaille Militaire, being the XI. to XIV. Volumes (inclusive) of the series relating to these matters. The 56th number covers the period 8th to 11th December, 1914 ; the 59th number the period 11th to 13th December, 1914 ; the 60th number the period 14th to 28th December, 1914 ; whilst the 70th number deals with the awards notified on the 29th December, 1914, and also contains an alphabetic list of all names which have appeared in the French Honours Lists published between the 1st August and 31st December, 1914.

The 57th number of the volume contains a short account of contingents raised in France, for service with the French Army, by foreigners resident in that country. The whole-hearted support thus offered to France by foreigners of all nationalities sojourning within her borders, as soon as the dangers of the German aggression became apparent in July, 1914, has naturally been much appreciated and affords at least some evidence of the view taken by them of the justice of the Great Republic's cause. It may be said with truth that it was not merely the patriotism of the early historians of the present colossal conflict which led them to refer to the present struggle as the " War of Right." In an introduction to the volume it is pointed out that the great contest in progress to-day is not one in which the decision sought concerns alone the question as to which of two groups of States shall be supreme in and dominate Europe, but that on this decision depends also the answer to the question as to which of two distinctive types of conscience shall in future guide the destinies of the world. At the present time, on the one side, there is the conscience imbued with ancient instincts of conquest, of spoliation and of hegemony, whilst on the other, there is the conscience born of a new code of morality, and guided by a philosophy more enlightened, more logical and more humane than that opposed to it, a conscience which seeks acceptance of principles having for their object respect for the rights and liberties of other peoples, the substitution of arbitration in an International Court of Supreme Judicature for the arbitrament of the sword as a means of settling international disputes, and a strict compliance with the provisions of conventions framed

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with the object of alleviating the sufferings of the victims of a war, in cases in which a resort to the arbitrament of the sword cannot be avoided.

The spontaneous and touching sympathy of foreigners which manifested itself towards France, in the autumn of 1914, may be attributed to the fact that the ultimate designs of Germany were seen through by them, and it was recognized by them that all those who took up arms to defend France would, at the same time, be striking a blow on behalf of the liberty of the peoples of this world and for the purpose of freeing them from the outrageous aggression and domination of the Teuton.

One of the most striking incidents in connection with the present War lies, perhaps, in the fact that Italy, a partner in the Triplice, abstained from entering into the lists against her western neighbour; indeed, she sympathised strongly with France, whilst, at the same time, many of her sons exhibited a most enthusiastic Francophil spirit. So strong was the sympathy felt towards France that very cordial demonstrations were made during the last days of July, 1914, by the Italians in Paris; they paraded the streets of the French capital shouting "Viva la Francia." Events moved quickly; on the 31st July, 1914, a notice was published in the French Press by prominent Italians calling on their compatriots to raise a contingent for service with the French Army. Three thousand Italians immediately responded to this appeal.

Appeals of a similar nature were also made, about the same time, to those of other nationalities resident in France, and within a few days many recruiting offices were specially opened for the enrolment of those desiring to serve in the several Foreign Legions then being raised in France. The text of many of these appeals are framed in stirring language and appear in the volume under review.

Certain difficulties had to be overcome in connection with the formation of these Foreign Legions as, according to French Law, foreigners could, at the beginning of the War, alone be enlisted to serve *for a period of five years*, and then only in special regiments. Early in August, 1914, the French Government passed a law permitting foreigners to enlist for service in the Foreign Legions for the duration of the War. The numbers of foreigners serving in these Foreign Legions on the 1st January, 1915, were, according to official returns, as follows:—

Belgians	1,462
British	379
Russians	3,393
Italians	4,913
Greeks	300
Luxemburgers	541
Spaniards	969
Swiss	1,467
Austro-Hungarians	1,369
Germans	1,072
Turks	592
Americans (from both Continents) ..	200
Other foreigners (including Alsatians and Lorrainers)	11,854
Total	28,511

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The Garibaldians had raised a special corps (included in the numbers of Italians given above), but at the end of March, 1915, this corps was disbanded, in order to allow Italians serving in it to repair to their own country to join the Italian Army; this drew away so many members of the corps that the numbers remaining were insufficient to provide the *personnel* for a special Garibaldian regiment.

By June, 1915, the numbers serving in the Foreign Legions in France rose to 32,000 men.

A short account is given in this number of the death of Bruno Garibaldi whilst leading his company to the attack and the manner in which his brothers recovered the body by digging a tunnel to the spot where it lay. A copy is also published of the letter of condolence addressed by the President of the French Republic to General Ricciotti Garibaldi sympathizing with him on the loss of his son, and the General's acknowledgment of the same.

The volume concludes with an expression of thanks to those friends, doubly dear to France, who came to her aid in her hour of need and have, in many cases, given up their lives fighting under the tri-colour of the Republic, in order that France may remain a free country and the seat of a true civilization.

The 58th number is entitled *L'Organisation du Crédit en Allemagne et en France*, and deals with the mechanism of finance, a highly-technical subject of very great interest, one, however, which requires to be specially studied for its proper understanding. In this little volume are reproduced five lectures on the Organization of Credit in Germany and in France given by Monsieur André Liesse during the winter of 1914—1915 at the Conservatoire National des Arts et Métiers in Paris.

In the preface to this volume it is pointed out that, in war, the credit of a belligerent nation is one of the most important factors so far as the ability of a belligerent to continue a struggle is concerned: hence the phrase "money forms the nerves of war."

In her preparations for the sudden and violent attack which she intended to deliver against her neighbours, at the hour of her own choosing, Germany naturally gave consideration to the financial problems having a bearing on the situation which was likely to arise once war was declared. However, in the measures Germany adopted to safeguard her financial position she made a serious miscalculation; she did not anticipate that a war provoked by her would last so long as the one being waged at the present time.

It is pointed out in the preface to this number that Germany had not only developed her industrial and commercial enterprises on a huge scale within her own territories, but had, at the same time, deeply invaded foreign countries, establishing therein very considerable commercial, industrial and banking establishments. Not satisfied with her commercial and industrial imperialism, she began to prepare for a military imperialism intended to secure for her the conquest of Europe. In the blindness of her folly she failed to realize that she could not with safety invest all her capital in national and foreign enterprises of a commercial nature, and, at the same time, apply considerable sums, raised by way of loan, and by the imposition of ordinary and extraordinary

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taxation, in the development of the *industry of war*. The adoption of such a course was bound to render it difficult for her to effect a mobilization of her capital just at the time when she might order a military mobilization. It ought to have been evident to her leaders that under such circumstances an immense amount of liquid capital would be absolutely necessary for the prosecution of the world-wide war Germany intended to provoke.

"Germans seem," says Monsieur Liesse, "to have overlooked the fact that the world-wide expansion of German commerce and industries could not fail to become a source of weakness, and would, in such a crisis, adversely affect the economic situation of the Empire and also prove extremely injurious to her vast interests."

Owing to the blockade of the coasts of Germany, questions affecting exchange are, for the time being, in abeyance as she is compelled to live on her own fat, but the day of reckoning is at hand! As soon as her military and naval forces are defeated, the real extent of the depreciation of her assets will be brought home to her; it seems hardly possible that she will be able to escape from bankruptcy.

The first of the lectures was delivered on the 14th December, 1914, and dealt in outline with the history of the establishment of land banks in Germany; the introduction of paper money; the establishment of German banks in foreign lands since 1871; the Reichsbank, which to some extent holds, in Germany, a position somewhat similar to that of the Bank of England in this country; military imperialism and commercial imperialism. Monsieur Liesse draws attention to the manner in which the banking business has, in Germany, been utilized for espionage purposes, and for the political as well as commercial conquest of South America, and to the fact that certain measures taken by the Reichsbank, in 1912 and 1913, indicate that preparations had already, at that time, been put in hand to meet the contingency of the present War breaking out at an early date. He concludes this lecture by pointing out that an early victory was essential to Germany in the interests of her economic situation. Germany still awaits this victory. "We hope and firmly believe," says Monsieur Liesse, "that no victory will be hers. From this point of view she has abused her Credit. She has drawn a Bill of Exchange at sight on Destiny, but on this Bill Destiny will endorse no acceptance."

The second lecture was delivered on the 14th January, 1915, and deals with German banks; their methods of working; the nature of the risks taken in German banking business, and the dangers thus incurred. Much valuable information is contained in this lecture concerning the mineral wealth of Germany and her commerce. Some of the causes which have brought about financial crises are referred to, and an explanation is given as to how a financial crisis may react on a banking business and lead to its failure.

Monsieur Liesse is not altogether satisfied that German banking methods are sound, but in concluding his second lecture he readily admits that they have done much for German trade. "The German banks have," he says, "it would be useless to deny, rendered an immense service to German industries. They have contributed to the

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development of a bold spirit of enterprise in Germany. But they have shown no moderation in their methods."

The third lecture was delivered on the 4th February, 1915, and deals with the military preparations of Prussia, the work of William I. and of Von Roon; the Prussianization of entire Germany; German expenditure in connection with the War; State borrowings and credit; War taxation.

The political and financial crises through which Germany has passed in recent times have made it necessary for her leaders in finance to effect a rapid mobilization of securities, and her loan banks and other similar institutions have thus become familiar with proceedings of this nature, which are no novelty to the general public beyond the Rhine.

Monsieur Liesse points out that War has been treated by Germany as a veritable industry, and the same attention has been devoted to details of organization and economics in the preparations for a military campaign by the Governmental Authorities, as that which an astute business man of the highest calibre devotes to the details of any commercial or industrial campaign he may be engaged upon. William I., King of Prussia and the first German Emperor of modern times, is credited with having taken the first steps towards bringing about the effective organization of the financial resources of the States, which now form the German empire. Monsieur Liesse says of him: "William only saw realities and those the realities of force. He held the opinion that war was an invigorating exercise for his people and he complained that Prussia had for too long remained inactive. . . . He possessed a sort of military mysticism which, on the one hand, rendered him a man full of faith, yet, on the other hand, made of him a dialectician full of duplicity, and one who was ever safeguarding the interests of Prussia by deceiving, without any scruple, his allies."

It was Von Roon who had the acumen to recognize the weaknesses in the Prussian armour, as shown during the mobilization ordered in 1859, when France was about to assist Italy in her struggle against Austria. In spite of the opposition of the liberal group of the middle classes, he persuaded the Prussian Parliament provisionally to vote nine million thalers (about £1,332,000) for the reorganization of the Prussian Army. It was by his skill that the weapon was forged which enabled Prussia to strike down her rivals and thus to obtain the ascendant position occupied by her in Central Europe since 1871.

The expenditure on the army and navy in Germany and in France during certain years, since 1895, is given in the volume under review; they may prove of interest and have in consequence been extracted.

Year.	Expenditure on Army and Navy. Germany.	France.
1895	£32,384,000	£38,000,000
1900	£41,056,000	£47,829,000
1905	£46,160,000	£45,748,000
1910	£63,292,000	£53,700,000
1912	£70,968,000	£56,704,000
1913	£100,124,000	£58,008,000
1914	£92,244,000	£71,000,000

The cost of pensions is not included in any of the above figures.

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It will be observed that the German expenditure increased slowly from 1895 to 1905, but jumped up suddenly in 1910; it was at this time that Germany began seriously to increase her armaments. Monsieur Liesse states that the total expenditure of Germany on her army and navy, during the 20 years covered by the period in the above table, has amounted to 1064 millions sterling, whereas the similar expenditure incurred by France, during the same period, has been 964 millions sterling, *i.e.*, 100 millions sterling less than the German expenditure, although during the first ten years of this period the French expenditure was greater than that of Germany.

In a modern war the factor of most importance is that the equipment, arms, ammunition and other apparatus in the hands of the troops shall be of the very latest types, and those embodying the newest inventions. With her greater expenditure in the last decade of the period under review the German Army ought logically to have been better provided than the French Army, but on this point no information is available. However, in spite of the huge expenditure incurred on armaments by Germany, her army was, at the end of the first three weeks of the present War, short of artillery ammunition; she had provided for a consumption of from 20,000 to 30,000 shells per diem, whereas the actual number of rounds fired was from three to four times as great.

In this lecture Monsieur Liesse also deals with the question of the French and German public funds and the fluctuations in their market value in recent years. The total National Debt of the German Empire and Prussia together amounts to about 760 millions sterling; in addition the other States, *e.g.*, Bavaria, Wurtemburg, Saxony, etc., have each their own debt. The total public debt of the German Empire, including that of the important municipalities amounts approximately to 1,500 millions sterling; it is estimated that not more than 80 millions sterling in value of the securities representing this public debt are held outside Germany. The deliberate policy appears to have been followed in Germany of restricting the sale of Imperial Exchequer issues outside the Fatherland, with a view to prevent, as far as possible, a fall in the market value of the Imperial and Prussian National Securities during periods of political and other crises.

In recent times considerable difficulty is said to have been experienced in Germany to get Exchequer issues taken up by the German public; the explanation given being that the German capitalist foresaw that war was coming and in consequence became apprehensive.

In 1913 Germany resorted to a novel method of raising money for public purposes, and thus gave an indication to those who could read between the lines that she was intensifying her efforts to push on her preparations for the coming war. By a law which came into force on 3rd July, 1913, a special tax was levied on the capital value of all estates exceeding a certain sum; this tax had to be paid in three instalments, the first instalment three months after the date of the passing of the law in question; the second, on the 15th February, 1915, and the third, on the 15th February, 1916. The yield of this tax was estimated at 60 millions sterling. During the present war attempts have been made in Germany to raise funds by yet another novel method. German merchants having relations with clients resident in neutral countries have

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calmly notified the latter that if they wished to continue business relations after the War they must allow the sums owing to them to be invested in German Loans. It does not appear probable that many foreigners have accepted these very promising offers! Nevertheless, it is quite possible that debtor merchants have placed the needs of their own country before those of their trade creditors.

Germany, it is pointed out by Monsieur Liesse, still possesses certain advantages. She still holds intact all her workshops and if she cannot manufacture, on any scale, for export, nevertheless she can devote the whole of the plant in these workshops to the production of munitions and other warlike stores.

The fourth lecture of the series was delivered on the 18th February, 1915, and deals with the financial preparations for war made in Germany; the means employed to obviate a monetary crisis; the *rôle* of the Reichsbank and the Clearing Houses; process of mobilizing capital; Loan Banks.

In order to reduce the amount of the specie in circulation in Germany, and thus to render it available for governmental purposes, much pressure has been brought to bear on business and trading firms to open banking accounts and to allow banks to run the accounting departments of such firms. To assist in this direction the Government, by a law of 1909, introduced the Postal Cheque system; thus in addition to its other duties the German Imperial Post Office acts, with the aid of the Reichsbank, to a great extent as an ordinary banker. Germany has also borrowed one of our own institutions, the Bank Clearing House; an institution of this kind having been established in recent years under the auspices of the Reichsbank. In 1913, the Berlin Clearing House dealt with over 15½ million transactions by merely adjusting differences which, without such an institution, would have involved the handling of over six times the amount of specie represented by the differences in question, *i.e.* a total of 22,640 millions sterling would have had to be handled instead of the differences amounting to 3,680 millions sterling. Since the beginning of the War Germany has organized a regular "Hunt for gold"; and every possible means, persuasion, favours and compulsion have been employed to extract the yellow metal from the keeping of private individuals; no one is allowed openly to take the precious metal out of Germany. Moreover, more and more paper money, without an adequate metallic reserve, has been issued in Germany. The notes in circulation represent 5, 10, 20 and 50 marks. But since the confidence of the German public is no longer so firm as it was at the beginning of the War, the Government has had recently to relax their efforts in relation to the "Hunt for gold."

Among other matters referred to in this lecture are those relating to the maximum prices fixed by Government for the necessities of life and the Moratorium which was decreed on the 4th August, 1914.

The fifth lecture was delivered on the 4th March, 1915, and deals with the financial policy of France before the War; the difficulties experienced at the beginning of the War; the recovery; the *rôle* of the Banque de France; Loan Societies; reasons for confidence in the future.

Monsieur Liesse states that during the past 15 years, at least, French

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finance has been conducted in a somewhat reckless manner. The public expenditure had been increasing most disproportionately to the requirements of the situation. In a decade some 80 millions had been added to the annual expenditure for which provision had to be made in the Budget. In no other country in Europe has the increase been proportionately so great. The fiscal menace had most adversely affected the French Rentes, which had, in consequence, dropped considerably in value. When war was declared a crisis supervened; the Government at once decreed a Moratorium, which was unfortunately framed, and also took other steps to prevent a catastrophe. Things were by no means going well in France; fortunately, the victory on the Marne was won in the nick of time and saved the situation.

In this lecture the position of the Banque de France and its relations with the Government are discussed. This Bank possesses the exclusive privilege of issuing bank notes in France. So far as the military situation was concerned, the increase of the German expenditure in armaments was a warning that war must be near at hand; a warning of which the Directors of the Banque de France took due notice. Some 18 months prior to the declaration of war these Directors had a stock of 20 and 5-franc notes specially printed to meet the emergency when it should arise; they realized that on the outbreak of hostilities gold and silver coinage would have, as far as possible, to be withdrawn from circulation. The issue of these notes and the reserve paper currency in hand began on the 31st July, 1914, and six days later, 400 million 20-franc and 200 million 5-franc notes were already in circulation.

At the outbreak of war, a shortage of 1-franc and 2-franc pieces made itself felt in certain towns; in these cases the Chambers of Commerce issued certificates representing the value of coins of these denominations and lodged with the Banque de France the Bank's own notes to cover the face value of the 1-franc and 2-franc certificates put into circulation.

The policy of the Banque de France has for many years been based on conservative principles, and every effort has been made by the Directors to increase its reserve of bullion; in 1913, the average amount of this reserve was 3,343 million francs, and on the 18th February, 1915, this reserve amounted to 4,237 million francs.

One of the earliest measures adopted by the French Government was to issue "Bons de la Défense Nationale." These Bons were issued in three denominations, having face values of 100, 500 and 1,000 francs respectively, and were put on the market on the 15th September, 1914. They were repayable at the end of 3, 6 or 12 calendar months and at once caught the fancy of the public. In the month of September the face value of the Bons taken up amounted to over 152 million francs; and on the 15th February, 1915, including the renewals, the amount repayable to the public in respect of these Bons amounted to no less a sum than 3,244 million francs (*i.e.* approximately 129¾ millions sterling at the normal rate of exchange). The French Government are also issuing Exchequer Bonds for a term of 10 years; they carry 5½ per cent. interest per annum, and the Government has the right to redeem them any time

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after five years from date of issue. The financial position of France is, according to Monsieur Liesse, eminently satisfactory. So far the War has not disturbed the economic situation in France to anything like the same extent that the economic situation has been disturbed in Germany. The French have every reason to be confident concerning the future.

The 61st and 69th numbers contain the text of the official communiqués addressed by the Central Government to the Provincial Civil Authorities in France and are the XII. and XIII. Volumes of the series dealing with such matters. The 61st number covers the period 1st—30th June, 1915, and the 69th number the period 1st—31st July, 1915; each number contains appendices giving details of the principal engagements, which have taken place during the same month as the communiqués contained therein.

The 62nd number is entitled *La Vie Économique en France pendant la Guerre Actuelle*, being the text of a lecture given by Monsieur P. Beauregard at the Conservatoire National des Arts et Métiers, Paris, on the 15th February, 1915. The lecture deals with the situation which arose in France on the outbreak of war. At this time, the manhood of the nation having been enrolled in the army, the transport and communication services having been either taken over by the military or seriously dislocated by the movements of troops, the question arose: "What is to become of our industries?" In this little volume will be found an interesting picture of the situation in France in the early days of the War, the problems which presented themselves for solution, and the manner in which the hundred and one difficulties met with were surmounted. Thanks to the conciliatory attitude of the military authorities, and the spirit shown by all classes to make the best of an inconvenient situation, matters soon began to resume something approaching normal conditions; France can, to-day, truly be said to be prosperous, in spite of the fact that the War has inflicted deep wounds on her.

The 63rd number is entitled *L'Œuvre de la France* and contains a French translation of articles dealing with the War which appeared in the London *Times* in July, 1915. These articles relate to the invasion of France and the fighting which took place subsequently down to the end of the spring of last year. The last of the articles in the series discusses the relations of France and Great Britain and therein is shown the reason why the peoples of these two countries should understand one another thoroughly.

The 64th number is entitled *La Guerre et les Monuments* and contains process reproductions of photographic views of Rheims Cathedral, of some of the more interesting sculptural details of the Cathedral, views of the Hôtel-Dieu at Beaune, of the Clothworkers' Hall, Ypres, of the Town Hall of Arras, etc. The text consists of two lectures given by Monsieur Lucien Magne, Inspector-General of Historical Monuments, on the 13th February, 1915, and on the 6th March, 1915, at the Conservatoire National des Arts et Métiers, Paris; the first lecture dealt with the architectural features, etc., of Rheims Cathedral, and the second with points of interest in connection with historical interest at Ypres, Louvain and Arras. The conduct of the German Army in destroying buildings of considerable beauty and of great historical interest,

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which can never be properly replaced, is stigmatized in the strongest language. Works of art are, Monsieur Magne points out, the patrimony of the whole human race and therefore the acts of destruction committed by the Germans are nothing less than *lèse-humanité*.

The 65th number is entitled *Les Origines Historiques de la Guerre ;* the text is illustrated by four sketch-maps showing the political boundaries of Europe in 1815, Germany as it was in 1866 and 1871, the Balkan States after the Treaty of Berlin and the Balkan States in 1914. The author of this little volume is Monsieur G. Arnoult, a French barrister. He points out that the diplomats attending the Congress of Vienna parcelled out Europe in 1815 in a very arbitrary manner without taking into account the aspirations of the peoples most concerned.

The object of the framers of the Treaty of 1815 was clearly that of circumscribing France, preventing her expansion northward and providing a powerful counterweight beyond her eastern frontiers. Nevertheless, France still remained the most important among the States of Europe. The conquerors had entered into a solemn pact to maintain and protect the State boundaries and organization set up by them ; however, during the course of the next few decades the edifice erected on the labours of the Congress of Vienna was rased to the ground. The Revolution of 1830 dissolved the Union of Holland and Belgium, and the subsequent steps by which the political boundaries of Europe, as laid down by the Treaties of 1815, have been wholly altered is told by Monsieur Arnoult in a series of short sketches (to which explanatory notes are appended) dealing with the causes, etc., of the Crimean War, the Italian War (of 1859), the Danish War (of 1864), the War of 1866, and the War of 1870–71. This series of sketches concludes with a reference to the aims of Germany. It is pointed out that by the Treaty of Frankfort (10th May, 1871), Bismarck brought about an unstable state of peace founded, on the one hand, on the isolation and abasement of France, and, on the other, on the effort to secure German hegemony, with, as a corollary, the expansion of Austria towards the east and also in the direction of the Balkans. It was not to be expected that proud France would meekly acquiesce in this attempt to humble her for all time. Four years after the Treaty of Frankfort was signed, Bismarck himself realized that he could not prevent the recovery of France to her former status in the world ; for he was snubbed both by Great Britain and by Russia in connection with his attempts further to humiliate France. Monsieur Arnoult next deals with the question of the Balkan States after the Treaty of Berlin ; he points out, under the heading *Guerre d'Orient*, that Bismarck thought that he would now be able to put into execution another part of his programme, namely, that relating to the enlargement of Austrian influence in the Balkans ; he hoped thereby, at the same time, to pay off his scores against Russia. Having set alight the fires in the east, Bismarck managed to prevent their extinguishment by depriving Russia of the fruits of her victory in her campaign against Turkey. Russia and her *protégés*, Bulgaria, Serbia and Montenegro, were deprived by Bismarck's manœuvres of the conquests which had been made at a great cost. Thanks to Bismarck the peace secured at the Congress of Berlin was as unstable as that obtained by the

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Treaty of Frankfort. Macedonia under the Sultan of Turkey created a situation as vexatious as that of Alsace-Lorraine under the German Emperor. Russia did not forgive Germany for her betrayal in 1878, and began to arm. Indeed, the distrust created among the nations, great and small, now became so acute that they all began to arm and to prepare for the mighty conflict which Germany was to provoke in 1914.

As long as Bismarck remained in power his policy remained the same; he strengthened the Alliance, entered into in 1879, between Germany and Austria by persuading Italy to come into partnership with these countries. In consequence, the Triple Alliance was formed in 1883. Bismarck did his best to create friction between Great Britain and France, and also between Italy and France in relation to their Colonial policy; he further worked to prevent a Franco-Russian Alliance. He nearly brought about a war in 1887; the firmness of Russia alone prevented this catastrophe. Finally, Bismarck was dismissed by his young master in 1890, and in 1891 the Franco-Russian Alliance became an accomplished fact. From 1891 to 1904, German hegemony had opposed to it the Franco-Russian Alliance. During this period Edward VII. had come to the throne, and by a masterly stroke established the Entente Cordiale. Germany now found herself surrounded by a group of Powers having identical interests as regards the Pan-German menace. Something had to be done to weaken this group; Russia was egged on to undertake her unfortunate military campaign against Japan. As a result, Russia being rendered, for the time, powerless, it was now France's turn to be humiliated; she had to dismiss Delcassé, then followed a series of vexatious incidents, Algeçiras, Casablanca, Agadir, and Europe was all this time kept in a state of perpetual tension. France now acquired Morocco; the price paid being the cession of a part of the French Congo. But matters were not going altogether well with the Triple Alliance; indeed, in 1911 Austria and Italy nearly came to blows in connection with the difficulties thrown by the former in Italy's way during the Tripoli War, especially in relation to the naval warfare against Turkey. The attitude of Italy towards the Triple Alliance in the autumn of 1914 can, to some extent, be explained by the experience she suffered at the hands of her Allies in 1911; the seeds of distrust were sown at that time. However, in 1909, before the incident last referred to occurred, Austria had already stretched out her hand and had annexed Bosnia and Herzegovina. This annexation raised, in relation to Serbia, a question analogous to that of Alsace-Lorraine in the case of France. It was only due to the intervention of France that Russia was persuaded to hold her hand on this occasion. The Balkan War followed, Turkey meeting the fate she well deserved, and the face of Eastern Europe was once more changed. The pretensions of Austria, supported by Germany, were, at this time, such that it was only by a miracle that a conflagration was avoided.

However the two Germanic Empires were bent on war and the crime of Serajevo (28th June, 1914) afforded to them as good an excuse as any other on which to provoke hostilities. All Bismarck's methods were invoked in setting the ball a-rolling; fortunately, those to whom the handling of the situation, on behalf of the Teutonic Powers, was

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left did not possess the genius of the Iron Chancellor, and this, probably, accounts for things having, from their point of view, miscarried.

The 66th number contains the text of two lectures delivered by Monsieur J. Violle at the Conservatoire des Arts et Métiers, Paris; the first of them entitled *Du Rôle de la Physique à la Guerre*, on the 10th December, 1914, and the second entitled *De l'Avenir de nos Industries Physiques après la Guerre*, on the 11th February, 1915. Both the lectures are illustrated with reproductions from photographs and engravings. In the first of these lectures is given the history of the development of submarine craft and aircraft; some reference is also made to the uses to which electricity is put for military purposes.

In the second lecture Monsieur Violle deals with questions relating to weights and measures; he has also something to say on the subject of optics, the manufacture of optical glass; and the electrical industry in France. The War has been a great eye-opener and has brought home to the most supine citizen how completely Germany had succeeded in monopolizing many fields of industry in France, as in other countries, with the output of her factories, and the serious risks run by France, owing to the fact that Germany had been permitted to kill many French industries.

The 67th number is a reproduction of the French Yellow Book, and contains 159 despatches covering the period 17th March, 1913, to 14th September, 1914. As some of the despatches comprising this diplomatic correspondence have already been published, in connection with other matters, in the earlier numbers of the *Pages d'Histoire* series, their text is not reproduced, but an appropriate reference to them is given instead.

The contents of this number are arranged in chapters. The first six despatches form the first chapter; they bear various dates between 17th March, 1913, and 22nd November, 1913. In these despatches is contained the warning sent by Monsieur Jules Cambon, French Ambassador at Berlin, concerning the preparations for war Germany was then making. To the first despatch are attached reports (dated 15th March, 1913) from the French military and naval attachés at Berlin, in which they make a close examination of the situation and show clearly enough that the war fever was being openly worked up in Germany. The second chapter contains the despatches bearing date 28th June, 1914, to 23rd July, 1914; they relate to the Serajevo crime, and the Austrian ultimatum sent to Serbia. The third chapter deals with correspondence relating to the Austrian ultimatum and the Serbian reply thereto; this correspondence covers the period 24th to 25th July, 1914. The fourth chapter contains the despatches bearing date 25th to 28th July, 1914; they deal with the rupture of diplomatic relations between Austria and Serbia.

The last despatch in this chapter, dated 28th July, 1914, is one from the French ambassador at Vienna to his Government, containing the information that he had learnt that Austria had officially declared war on Serbia from noon that day. The fifth chapter contains despatches, dated 29th to 31st July, 1914, relating to the declaration of war by Austria and to the ultimatum sent by Germany to Russia. In a despatch, dated 29th July, 1914, from the Quai d'Orsay to the French ambassadors

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at St. Petersburg, London, Berlin, Rome, Vienna, Constantinople and Belgrade, the European situation is briefly reviewed. At this date no doubt remained as to Austro-German intentions. The despatch in question states that Austria, disturbed by the Slav propaganda, had decided to punish Serbia, and that Germany was interposing herself between her ally and the other Powers, claiming that the dispute between Austria and Serbia was merely a matter of local importance. The German Government, at the same time, expressed the opinion that Russia should be satisfied with Austria's assurance that no territorial aggrandisement was intended and that the latter would respect the integrity of Serbia. Germany, on the one hand, refused to put the curb on Austria, yet, on the other, she desired pressure to be brought to bear on Russia to restrain her from protecting her own interests in the Balkans. The attitude both at the Wilhelmstrasse and at the Ballplatz appeared to the French Government most inconsistent and unsatisfactory. The Berlin Foreign Office, whilst it urged that common action should be taken by the four Great Powers concerned, at the same time, rejected all proposals regarding the assembly of a Conference to attain this end. On the other hand, the Vienna Foreign Office deceived itself by thinking that St. Petersburg would be induced to enter into a direct discussion with it on the matters in dispute, whilst it could at the same time pursue against Serbia the course already decided upon.

Other despatches in this chapter convey information regarding the military activities in Germany and Austria.

The situation had already become exceedingly critical; German patrols were reported to have violated the French frontier on the 29th July, 1914. France had been assured of British support in the event of a war, but the question which weighed heavily on the minds of French statesmen was: "Will Great Britain wait to act until France is invaded?" The despatches show that on the 31st July, 1914, the British Foreign Minister was still unable to give a definite reply to this question.

The last despatch in this chapter is dated 31st July, 1914; in it the French ambassador at Brussels reported to his Government that the Havas agency had announced that the German Government had issued orders for the precautionary measures, known as *Kriegsgefahrzustand* (war imminent), to be taken.

The sixth chapter contains despatches bearing date 1st to 3rd August, 1914; they deal with the declaration of war by Germany against Russia and also against France.

In a despatch, dated 1st August, 1914, addressed by the French Prime Minister to the French ambassadors in London, St. Petersburg, Berlin, Vienna and Rome, the information is given them that Germany had sent an ultimatum to Russia and that it was evident she desired war with France also. It is stated that the German ambassador in Paris had called at the Quai d'Orsay to pay his respects to the President of the French Republic and had asked that steps should be taken for his personal safety. This despatch concludes as follows:—"We know that he has already taken steps for the safety of the Archives of the Embassy. This rupture of diplomatic relations without direct conflict, and although no definite reply in the negative has been given to him, is characteristic

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of the wish held in Germany to make war on France. The absence of sincerity in his declaration of pacific intentions is shown by this rupture, at a time when proposals regarding negotiations had been accepted by Austria in agreement with Russia."

On the date last mentioned the French ambassador in London was able to telegraph to his Government that the British fleet was mobilized and that the question of preventing the German fleet from making a demonstration against the French coasts was under the consideration of the British Government. At this time, both Germany and Austria were still attempting to secure the neutrality of Great Britain, and did not hesitate to misrepresent the situation in order to gain their ends.

Germany, having already violated French territory at several points along the Eastern frontier of France, now recalled her ambassador at Paris; he called at the Quai d'Orsay on the 3rd August, 1914, to leave the formal declaration of war by Germany against France. This document is reproduced in the volume under review and contains the absurd accusations against France regarding the violation by her of Belgian neutrality, the bombing, by French airmen, of buildings near Wesel, of the railway at Carlsruhe and Nuremberg, of which allegations so much was heard in the early days of the War.

This chapter also contains a despatch from the French ambassador at Copenhagen to the French Foreign Minister forwarding reports from Monsieur Jules Cambon describing his final experiences at Berlin, and the abominable treatment to which he was subjected at the hands of the German Government. The seventh chapter deals with the declaration of the Triple Entente (dated 4th September, 1914), in which Great Britain, France and Russia solemnly bind themselves jointly and severally not to make a separate peace.

The 68th number contains a diary of the War covering the period 1st January to 30th June, 1915, and forms a very handy book of reference regarding the events which have occurred during this period.

W. A. J. O'MEARA.

THE YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1916.

Colonel Maude in his article "The Allies' Strategy in 1915" points out that the disclosure of official information, early last year, has made it possible to publish the plan of campaign agreed upon in December, 1914, by the Military Headquarters of the Allied Armies. "The quintessence of the whole plan," he tells us, "consisted in maintaining, and if possible increasing, the rate of wastage of the German armies, for in this way only was it possible to form an approximate estimate of the time the War must last, and hence the financial effort to carry on that it would involve." Information was, it is stated, in possession of the Intelligence Offices which indicated that during the first five months of the War the wastage in the German Army

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alone was at the rate of a quarter of a million a month, and it was expected that if this rate of wastage could be maintained, then so far as Germany was concerned "the supply of men fit for the field would be exhausted within eighteen months." Further, it was felt that "if the enemy could be induced to *extend his frontiers*, the inevitable end would but come the sooner, always provided that a plan could be devised which would compel him to keep on attacking, under unfavourable conditions, at points of our own choice."

To bring about the results aimed at, a different scheme was, Colonel Maude points out, needed in each theatre of operations. "The Russians had room to manœuvre, and could afford to retreat far enough to constitute a serious danger to the Germans. *We* in the West had to *hold our ground*, and, being hemmed in by the sea on one side and the Rhine on the other, were denied all manœuvring possibilities." In the Western Theatre General Joffre's plan of campaign consisted in "threatening, by the methods of fortress warfare, vital points in the lateral communications along the enemy's front which he could not afford to surrender without endangering the stability of his whole line."

In dealing with the Eastern Theatre Colonel Maude states: "The first move in the Russian design was a request to the Western Allies to attack the Dardanelles, ostensibly to open out communications from the Black Sea, and to relieve pressure in the Caucasus; really, it was in order to paralyze the Austro-German, Bulgarian, Greek, and Roumanian intrigues, which every Foreign Office knew to be in full activity."

The Russian invasion into Bukhovina, the immediate despatch of four German Army Corps to the assistance of Austria, and the consequent retreat of the Russians towards Cernowitz are touched upon, as well as the Russian operations in Galicia which resulted in the occupation of the Passes in the Carpathians by the Russian Army towards the end of March, 1915, when Buda Pest and Vienna were threatened "more imminently even than before." The great General Staff in Berlin, as is well known, met this danger by a concentration about Cracow, and the Russians, in consequence, fell back before the German advance, the Grand Duke Nicholas drawing his forces together in South Poland.

The campaign in Poland is next dealt with, and attention is drawn to the difficulties of ammunition supply which so embarrassed the Grand Duke Nicholas at this period.

Colonel Maude points out that the Germans, having met with disappointment in the hopes they had cherished of "raising an insurrection behind the Russian armies, turned their attention to the overrunning of as much territory as possible with the object of acquiring 'material guarantees' with which to barter when the time for peace negotiations should arrive; and as the possession of the Balkan peninsula could threaten British interests both in India and Egypt in a most vital manner, whereas neither France nor Russia would be adversely affected by such a move, it seemed that the seizure of Salonica and the occupation of Turkish territory might drive a wedge into the mighty tree of the Grand Alliance, set it tottering, and afford an opportunity for a separate treaty of peace which should leave Great Britain out." The Allied attacks in

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Champagne and the Loos region just when the Germans and Austrians were completely committed in their Balkan adventure resulted in a complete derangement in the plans of the Central Powers; whilst the resistance of the Serbian Army gained the time necessary to permit the French and British to land in sufficient force at Salonica to be in a position to check the extension eastward of the German invasion. The Russians in their turn now created a sudden diversion by rapidly transferring their troops, massing them in the angle of Bessarabia, and, at the same time, attacking in force all along their southern front, from the Marshes in the north of Cernowitz. The Germans realizing the peril in which their troops in the Balkans were placed by these Russian operations began immediately to withdraw from Bulgaria in January, 1916, with the result that the Bulgarians, being left without support from German artillery, were unable to attack the Salonica position with any prospect of success.

The opinion is expressed in the original article that "our operations have inflicted on the enemy a wastage well in excess of the quarter of million a month on which French calculations of the duration of the war were primarily based, and that the reservoirs of valid human material have now run dry in both empires."

The one thing which stands out clearly above others is the incalculable advantages which the Allies have derived hitherto by possessing command of the sea.

W. A. J. O'MEARA.

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NOTICES OF MAGAZINES.

REVUE MILITAIRE SUISSE.

No. 10.—*October*, 1916.

Impressions from the Austro-Hungarian Front.

In Serbia with General Kövess's Army.

The article begun in the number of the *Revue* for August, 1916, is continued in the number of this publication now under review.

The writer of the *Revue* article was with the VIII. Austro-Hungarian Army Corps during the advance on Arangjelovatz and briefly describes the engagement fought on the 26th October, 1915, in the neighbourhood of that place. A sketch map of the locality accompanies the descriptive matter.

The VIII. Austro-Hungarian Army Corps reached Mladenovatz on the morning of the 25th October, 1915, and pushed forward its 59th Division towards Marcovatz and its 58th Division between the road to Topola and the Belgrade-Nish Railway: the Serbians retiring, at the same time, southwards to the Orasacko-Kopljari Heights.

The writer of the *Revue* article accompanied the 9th Mountain Brigade (forming part of the 59th Division) on the 26th October, 1916. He tells us that the first objective assigned to this brigade on the date in question was the capture of the village of Kopljari; this brigade was supported on its left by another Austro-Hungarian Brigade, which advanced along the road to Topola, whilst a German Division, on its right, was directed against Arangjelovatz. Incidentally, it is pointed out that the Austro-Hungarian Brigades are not organized on a regimental basis, but consist of five infantry battalions, with machine-gun detachments, a brigade of mountain artillery, a company of Engineers and a Sanitary Detachment. It is also stated that the 9th Mountain Brigade had been withdrawn from the Alps to reinforce the 59th Division, as this division had suffered casualties, amounting to 1,800 men, before Belgrade.

The Austro-Hungarian advance commenced at 9 a.m. on the 26th October, 1915, and at 10 a.m. the 9th Mountain Brigade deployed for the attack. The firing line of this brigade was soon seen ascending the slopes of the Orasacko Heights; at the same time the patrols sent out on its flanks reported that they had established contact

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with the brigades on the right and left of it. Almost simultaneously dense lines of German troops appeared on the scene near the Orasacko Heights.

The Germans threatened to turn the left flank of the Serbians near Bukovic, who in consequence withdrew from their first line of defences; the Serbians were a little later also driven out of Kopljari by the 9th Mountain Brigade. By 2.30 p.m., the Germans were in possession of Arangjelovatz, having driven back the Serbian left flank towards Topola. On the same evening the 9th Mountain Brigade occupied Kopljari and halted there for the night.

The writer of the *Revue* article states that the *rucksack* which has recently been introduced into the Austro-Hungarian Army to do duty as a knapsack has proved a failure. The following are said to be its chief drawbacks:—

1. The most impermeable canvas has been found not to be sufficiently waterproof for army purposes.

2. The soldier tries to cram too much into the sack, and thus overloads himself, reducing his marching efficiency.

3. It is impossible to pack a *rucksack* tidily, everything is thrown in pell-mell; this tends to develop slovenly habits in the soldier.

The Austrian Landsturm are still equipped with raw-hide knapsacks; and the men of the field army are already abandoning the *rucksack* for the old pattern knapsack. Whenever Regulars come into contact with Landsturm troops and can effect an exchange with them of their sack for the old pack, they do so.

On Discipline.

An officer of the Belgian Army craves permission to say a few words on the oft-discussed subject of discipline.

He points out that discipline consists in nothing more than obedience to a collection of regulations and laws; military discipline, being the submission to a special code of regulations and laws framed for the governance of an army. Although there is no reason why the regulations of various nations should have any similarity between, yet as a matter of fact the points of difference in the texts of the military codes of the various nations are exceeding small and unimportant.

Dealing next with the question of the observance of the forms by which discipline is judged, the author of the *Revue* article points out that were it possible for the French and the German armies to be governed by regulations drawn up in identically equivalent language, nevertheless the outward forms observed by the two armies in matters of discipline would never be the same. Differences would always be apparent, due mainly to the racial qualities of the two nations. It is well known to students of psychology and pedagogy that to obtain the best results the methods of education and instruction should be based on the intellectual and moral dispositions of those to be taught. Owing to the short time available for the training of the recruits of an army, the idiosyncrasies of each individual man cannot be studied and catered

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for even were it possible to have as instructors men of the most highly-developed psychological perspicacity. Admitting that ideal methods for inculcating discipline in an army cannot be attained, resort should nevertheless be had, he urges, to those means which will induce obedience in the soldier owing to the recognition of the necessity and a reasoned respect for discipline, rather than on account of the fear inspired in him by his superiors. He is no believer in incessant drill.

Three Cases of Usurpation of Political Power by the Military.

The article in the *Revue* dealing with the above subject is contributed by Colonel Feyler. The adventures of the IV. Greek Army Corps, he tells us, will occupy a most interesting place in the chapter of history which deals with *military policy*. According to German reports, these Greek troops, *faithful to the decision of their Sovereign to remain neutral*, continued at their posts on the Macedonian frontier, with arms grounded, at the time that the Germano-Bulgarian forces entered Greece during their advance on Kavalla. When the communications of the IV. Greek Army Corps with its base were cut, General Hadjopoulos, their Commander, arranged with the German Commander, not that he should be allowed to rejoin the Greek Army, but that his command should be transported to Berlin. The incident in question is merely a case of history repeating itself, and, at the time that General Hadjopoulos entered into his agreement with the Germans, Press references were made to the somewhat similar treaty entered into between the Prussian General Count von York von Wartenburg and the Russian General Diebitch on the 30th December, 1812.

Colonel Feyler deals in some detail with the last-mentioned incident, based on Clausewitz's account relating thereto in his work on the Campaign of 1812 in Russia.

The principal actors in the incident in question were all Prussians by birth and education.

Clausewitz began his career in the Prussian Army, but in 1806 transferred his services to Russia ; he was, in 1812, on General Diebitch's Staff, being then a lieutenant-colonel.

Diebitch, on leaving the Cadets' School in Prussia, at once joined the Russian Army. In 1812, being then only 27 years of age, he was promoted to the rank of major-general.

Von York had served in the Prussian Army all his life and is one of the heroes of Prussian military history, but he has come in for some criticism at the hands of Prussian idealists whose views on the loyalty due from a soldier are so strict as to lead them to censure a line of conduct in a military man which is only permissible, in their opinion, to those whose calling compels them to tread the tortuous paths of diplomacy. His age in 1812 was 53.

In February, 1812, Napoleon, when organizing his campaign against Russia, entered into a treaty with the King of Prussia, in which provision was made for the latter to furnish a contingent of 20,000 men and

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60 guns for service with the French Army about to take the field in Russia. This contingent composed the 27th Prussian Division and with the 7th French Division under Grandjean formed the X. Army Corps under the French Marshal Macdonald.

Von York took over command of this 27th Prussian Division at the beginning of the autumn of 1812, about the time that things commenced to go ill with Napoleon's Grand Army. On the 19th December, 1812, the French commenced to retire across the Niemen into East Prussia. Macdonald was, at this time, with Grandjean's Division; a part of the Prussian troops under General Massenbach were co-operating with the last mentioned Division. Macdonald's immediate objective was Tilsit. Von York's command was at this time at Mittau, two marches in rear of Grandjean's.

The Russian General Wittgenstein, who was pursuing Macdonald, was gaining ground on him, so much so indeed that some Russian troops had succeeded in barring the approaches to Tilsit when Macdonald's advanced guard arrived in the neighbourhood of this town. However, Macdonald was able to force his way through the Russians and entered Tilsit on the 28th December, 1812. The commander of the X. French Army Corps had been disturbed since the 25th December regarding the safety of Von York's column with which he had lost touch. On the date last mentioned Von York was himself at Tauroggen, whilst his troops were near Koltiniani, two marches in rear of Macdonald's main body, but a small Russian force under Diebitch had succeeded in getting between the two parts of the X. French Army Corps. The Russian force numbered 1,400 men only, mainly cavalry, whilst Von York had 10,000 men under him. Although Diebitch was able to hold up Macdonald's patrols, he could not have hoped to make headway against Von York. In this situation, Diebitch had apparently made up his mind to gain his ends otherwise than by fighting. He sent an orderly officer to Von York to inform him that a considerable force had cut the communications of the 27th Prussian Division and to suggest that in order that useless bloodshed might be avoided the two commanders should come to an understanding as to the best way of meeting the situation.

Von York agreed to meet Diebitch, and an interview between these two generals was held between the outpost lines of the two forces at dusk. Diebitch naturally tried to make the most of his little force, but Von York does not seem to have been taken in. Diebitch's game was to detach Prussia from the French Alliance and with this object in view he desired to enter into a Treaty of Neutrality with Von York. The latter, whilst not committing himself definitely on the subject, showed himself ready to enter into such a treaty, if he could satisfy himself that the military situation was such as to justify him in taking this step. The way was opened for a further discussion on the subject and Diebitch, taking advantage of the opportunity, entrusted the further negotiations to Clausewitz, who not without difficulty succeeded in winning over Von York. The latter, not willing to do things by halves, brought over Massenbach also with him. The Prussian and Russian

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commanders met by the Mill of Poscherum at 8 a.m. on the 30th December, 1812, and solemnly entered into the Treaty of Tauroggen, whereby the neutrality of the Prussian contingent was secured. Von York in this matter substituted then his own policy for that of the Prussian Government of the day. Colonel Feyler expresses the opinion that the usurpation of political powers, outside the range of their proper authority, by military commanders, as on the occasion referred to, cannot be regarded as creditable to the principal actors even where the action taken is not prejudicial to the interests of their country and of the army to which they belong. Details of a part of the negotiations which led to the signing of the Treaty are to be found in the *Revue* article.

Colonel Feyler next deals with the "kidnapping" by Germany of the IV. Greek Army Corps. He asks: "Did the Greek General Hadjopoulos carry on negotiations for as long a time as General Von York before he surrendered himself as a neutral prisoner to Germany?" Very little light has been thrown on the subject; what information there is comes from Berlin and is of an equivocal nature. In the first despatches from the German capital it was represented that the Greek troops desired to remain faithful to the declared policy of neutrality of their Chief, King Constantine. Nevertheless, they have, says Colonel Feyler, been put or have put themselves into a most humiliating position; a position which does not redound to the reputation of their nation nor of their Government.

The conduct of Greece in relation to the non-fulfilment of Treaty obligations towards Serbia and the half-hearted measures adopted for the maintenance of her neutrality, measures which have resulted in the occupation of her territory by troops of both belligerent groups, are severely criticized. Under the pretext of holding an even balance, she has not only ceded a part of her soil to the belligerents, but also a part of her army and a great part of her Sovereignty. For these things neither Germany nor the Quadruple Entente Powers are responsible but Greece alone.

As General Von York did, so has King Constantine, Chief of the Hellenic Army, done; he has caused his army to take part in a political manœuvre dictated by a personal policy and one which is in conflict with the aspirations of his people.

Finally, Colonel Feyler states that Switzerland herself, in 1914, furnished the third example of the danger arising from the usurpation of political power by the military. He points out that the international policy of the Swiss Confederation was governed at the beginning of the War and is still governed by a Treaty, which intimately affects its honour, as did the Greco-Serb Treaty that of the Hellenic Government. Switzerland has entered into an obligation to observe the strictest neutrality in all international conflicts which do not affect her own sovereign rights.

These are the considerations on which the control of the Federal Army and the conduct of its members should be based; that is to say, the army chiefs, in the exercise of their military functions, should be

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careful not to commit any act which could raise the smallest suspicion, on just grounds, regarding their attitude towards the belligerent Powers. Colonel Feyler states that, owing to want of such circumspection, distrust of the Swiss Army has unfortunately arisen among the Powers of the Quadruple Entente, though probably not of so deep a nature as to involve the adoption of precautionary measures by their armies.

Colonel Feyler next draws attention to a publication which has recently been published in Paris, namely a volume entitled *La Philosophie Sociale et la Guerre Actuelle*, published by Félix Alcan, Paris, at 3 fr. 50 c. The volume, he says, is written in a tone of moderation. Its author is Monsieur J. Maxwell, a French barrister. In one of the chapters of this work, its author deals with the statement, so often made, that the Germans are poor students of psychology, because they have expected to inspire fear from the display of force. Monsieur Maxwell, however, does not agree that the German campaign of "frightfulness" has failed and, in support of his views, refers to the fact that neither the invasion of Belgium and Luxemburg nor the most outrageous violations of International Law has brought about any protest of a practical nature at the hands of neutrals. With regard to Switzerland particularly he says: "Do not let the Swiss run away with the idea that, when the hour strikes, we shall forget betrayals and wrongs we have suffered, any more than we shall forget the consoling sympathy shown us."

In commenting on the views expressed by Monsieur Maxwell in his work Colonel Feyler states that similar views are extensively held both by the Swiss and also by belligerents and that "if opinion is unanimous that the Swiss people deserve thanks for their humanitarian efforts, yet the Federal Government is suspect and categorical reproaches are levelled at our highest military chiefs for having practised a neutrality as well malevolent as hostile."

He points out that the series of *affaires militaires* which have occurred in Switzerland are responsible for the unfortunate opinions formed on the subject of Swiss neutrality. In Von York's case success attended wrongful conduct; in the case of the Greek General Staff success has not been achieved by wrongful conduct; on the contrary, Greece and her soldiers have suffered humiliation. In the case of Switzerland, the tendency on the part of the military chiefs to follow a personal policy, contrary to the obligations undertaken by the Republic, apparently still continues, and the results which will follow are uncertain. Colonel Feyler in summing up the three cases of usurpation of political power by the military remarks that in the case of General Von York, although his intentions were patriotic, nevertheless from the point of view of the *military conscience*, his action tarnished the reputation for loyalty which the public like to associate with the conduct of a soldier. A soldier should never lend himself to acts which would result in deceiving his chief, in negotiations for the surrender of his troops and, in a general way, in any equivocal or base proceedings.

The incident connected with the IV. Greek Army Corps does not appear to have gained even any political advantage for Greece. Whether

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the transport of these troops was negotiated in accordance with the intentions of the Chief of the Army, or whether it was an act of violence against the Greek troops, the cause of the incident arose from the personal and time-serving policy of the Chief of the State. The incident has strained the military mechanism ; dispersion of the army and abasement of the nation have followed in its train. The wrongful acts of the Swiss General Staff, rendered possible by want of resolution on the part of the Government, have provoked dissensions which have weakened national defence and have, at the same time, awakened suspicions, which have put and still put Switzerland in danger, and of which Switzerland will for a long time yet feel the bitter taste.

Notes and News.

Switzerland.—A special correspondent contributes an article in which he states that in the last session of the Federal Parliament, which closed on the 4th October last, debates on matters connected with the Swiss Army occupied an important place. There have been many complaints recently regarding abuses which are alleged to have crept into the Swiss Army ; the Federal Council have agreed to carry out an investigation into these matters and have promised to take remedial measures, if the complaints should prove to be well founded. The fact that it was a German-Swiss who tabled the motion calling on the Government to institute an enquiry into the alleged abuses has given considerable satisfaction in Switzerland.

Another *affaire militaire* appears to require the attention of the Federal Council ; this time the alleged offender is a staff-surgeon.

Whilst the motion relating to the alleged abuses in the army was under discussion in the Council of State, another motion, signed by all the French-Swiss Deputies, was hotly discussed ; by its terms the Federal Council was called upon to define more exactly the relations between the civil and military authorities. The motion aimed more particularly at securing the supremacy of the civil power over the military ; it was negatived by 89 to 55 votes. The majority consisted of the German Swiss radical and catholic compact, whilst the minority was composed of the French Swiss and the Socialists.

It is pointed out in this article that although the Swiss Militia has made much progress during the past two years in most matters, it has not done so where discipline is concerned. It is suggested that the way to bring about an improvement in this respect is not only by taking severe measures in all cases of infractions of rules and regulations, but also by reforming the system of instruction of young officers and by improving the national education of the Swiss people.

Information.

L'Union Fédérale.—The *Revue* publishes a letter addressed by Monsieur J. B. Rusch, the Editor of the *Aargauer Volks Blatt*, to the *Gazette de Lausanne ;* it is dated Baden, 12th October, 1916. In an editorial

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note it is stated that this letter has a considerable value. Since the beginning of the War many people have been of opinion that the present hostilities cannot come to an end until the German element in Switzerland thoroughly understands that there must be a return to the liberal and democratic traditions, which were the origin and *raison d'être* of the Swiss Confederation. It is stated that the letter in question has the proper ring about it; it shows the direction in which things must move to re-create a proper national spirit in Switzerland. The editorial note continues: "The false *Kriegstimmung* of the early days of the War is dying out; good sense is coming by its own; Swiss sovereignty, lost sight of by some, has come to light again; the conception of Swiss neutrality will emerge revivified, and strengthened by the breath of independence and pride."

This number of the *Revue* concludes with a bibliography, in which the publication is announced of a number of works dealing with the present War.

W. A. J. O'MEARA.

RIVISTA DI ARTIGLIERIA E GENIO.

May—June, 1916.

RESUMPTION OF ITALIAN MILITARY OPERATIONS FROM THE 10TH MARCH TO THE END OF APRIL, 1916.

Up to the 10th of March when the German attacks on Verdun became intensified, the Supreme Italian Command for consolidation with its Allies, desired in its turn to exercise a strong offensive pressure on the theatre of operations in order to impede the enemy, especially his artillery, by eventual diminution of his forces against the French front. So after the long winter calm, the Italian activity was again begun but with renewed vigour, although seriously impeded by a period of bad weather.

The first successful attacks were made on the 6th March on Tofana, on the 7th on the Zagora centre; on the 13th on Rombou and on the heights of Lucinico (Gorizia) On the latter day there was obstinate fighting along all the front of the Lower Isonzo and the Carso, on the side of Sabotino, on the positions east of Montfalcone, with particularly good results in the zone of San Martino del Carso. Strong redoubts were stormed and one of the principal places of the enemy's defences called Dente del Groviglio was captured. On the 14th new progress was made on the heights of Lucinico, on the 15th in Tofana; the 17th on the height Sabotino, where the Bosco Quadrato (square wood) was occupied. The same day the Alpine troops captured the formidable positions of Gelbwand north-east of Joi de Montasio. On the 21st the enemy suffered loss at Mezli and on Siene (Monte Nero);

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on the 22nd possession was taken of the Cordevole Height north-east of Sasso di Mezzodi.

Surprised by an unexpected offensive, the enemy, while calling up reinforcements in haste from other fronts, attempted violent counter-attacks with the idea of recapturing the ground that we had taken from time to time, and especially of paralyzing our forward attacks on these positions. Obstinate combats took place south-west of S. Martino del Carso on the 14th and 16th March; on the heights of S. Maria di Tolmine on the 17th and 18th March; in Valle Sugana against the front of Marter-Tesobbo on the 22nd March. Everywhere the Italian troops resisted strongly the enemy's attacks, rectifying the front in those parts which were much exposed to the enemy's artillery.

* * *

The Austrian Command having successively received large reinforcements from the Balkans and Russian fronts, attacked on the 26th March with the assistance of intense artillery action and thrust forward a violent attack against important positions on the height But (Carnia) causing at the moment the abandonment of Pal Piccolo. The Italian counter-attack was promptly made and extended along all the front from Monte Croce to Pal Grande, and after a violent combat lasting 30 hours the strong positions of Solletta Freikhofel and of the Passo del Cavallo were stormed and the Pal Piccolo regained. On the same day, the 26th, the Austrians again attacked the heights of Podgora and Peuma to the north-west of Gorizia. Here the enemy had a slight initial success which was transformed on the 27th into a magnificent victory for the Italian arms. The fighting lasted 40 hours during which the Austrians made a strong and obstinate defence, but at sunset after vigorous endeavours the enemy was repulsed, all the contested trenches being stormed. Collecting fresh reinforcements the enemy on the 29th recovered ground on the heights Padora to Sabotino to the north-west of Gorizia, but being several times repulsed and counter-attacked was eventually placed in flight leaving many dead on the ground.

From that day, the Austrian Command gave up further offensive endeavours, and instead, in the southern zone of the Trentino made large concentrations of troops, especially artillery. During this first period of the operations the Italians captured about 800 prisoners (including 30 officers), four mitrailleuses, a great quantity of arms and ammunition, and war material of every kind.

* * *

Again taking the offensive, the Italians were not content with the few brilliant successes which followed for there succeeded a new phase of increasing activity. The operations developed in a greater manner along the frontier of Trentino-alto Adige, in the Upper Isonzo and on the southern margin of the Carso.

In the bitter and icy zone of Adamello (Valcamonica) on the days of

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April 11th and 12th in tempestuous weather the Alpine troops stormed the enemy's positions on the slopes of Lobbia Alta and along the crest of Dosson di Genova at a height of beyond 3,300 metres. On the 17th detachments occupied the pass of Monte Fumo (3,402 m.). On the 20th they captured the difficult outposts of Lobbia and of Fumo and the steep precipices of the high Chiese, after two days of obstinate fighting on the glaciers, and stormed the positions of Crozzon di Fargorida (3,082 m.), of Crozzon di Lares (3,354 m.), of the Lares Pass (3,255 m.) and of Cavento (3,195 m.).

On the 5th in the valley of Daone and in Giudicare possession was taken of an enemy's position north-west of Pracul in the Plaz country and of a height strongly fortified by the enemy between the bridges of Plubega and Cima Palone.

In the Valle di Ledro on the 5th April there were methodical offensives aiming at assuring the possession of the deep valley with the capture of the heights that form the southern slopes, and these, together with a strong line of enemy's entrenchments along the southern slopes of Monte Pari and of Cima d'Oro and on the steep rocks of Monte Speroni, were captured on the 10th.

* * *

In Valle Sugnana the first skirmishes took place on the days of the 4th, 5th and 6th of April; reconnoitring detachments assaulted and dispersed the enemy's troops on the front of the torrent Larganza. On the 12th the terraces of S. Osvaldo and half of the formidable position of Panarotta were captured. The enemy on the 16th launched a very violent attack with strong infantry columns—14 battalions. Repulsed with heavy losses, he concentrated a heavy fire on our positions with guns of every calibre.

On the 17th, 18th, and 21st, new attacks were repulsed by the solid resistance of the Italians, but the intense and uninterrupted fire of the enemy's artillery caused them to abandon the more advanced positions which there had not been time to reinforce against the artillery fire. The retirement was effected in a most orderly manner, and without pressure by the enemy.

On the Cordevole Height on the night of the 18th a heavy mine was exploded under the crest of Col di Lana, the infantry detachments of the Calabrian Brigade overcoming with the bayonet the last of the enemy's remaining positions. On the 19th April the enemy's artillery concentrated a very violent fire on the Italian trenches interrupted only by a short rest, during which inpetuous attacks were always repulsed by our troops.

At the head of the valley of Sexten on the night of the 16th Italian detachments gained the Passo della Sentinella at a height of 2,717 m.

* * *

On the Upper Isonzo on the 8th April the enemy made a surprise assault on a lunette at Vodil—Monte Nero—and succeeded in partly breaking through, but was promptly counter-attacked and repulsed with heavy losses. Other enemy's attacks against positions in

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Ravniglaz and on Iavorek in Conca di Piezzo were also repulsed on the 12th and 13th.

More violent action took place on Mezli (Monte Nero) on the 13th. The attack commenced at night and was protracted with intense vigour and alternating results. In the evening the enemy was counter-attacked and repulsed leaving many dead on the ground.

The enemy made fresh endeavours against positions on Cukla and Iavorek on the night of the 27th, and against Ravniglaz on the 28th, which failed owing to vigilance and firm resistance.

* * *

Brilliant offensive operations were carried out by the Acqui Brigade in the sector east of Selz. Commencing on the 27th March, by the 29th complete possession was taken of a well-fortified trench 150 metres in length. On the night of the 1st April the Italian infantry captured another trench, and retained possession against violent counter-attacks.

Operations were suspended up to the 22nd, in order to reinforce the captured positions. On the night of the 22nd with a new impetuous attack the Acqui Brigade stormed another and more strongly fortified entrenchment, extending for 350 mètres north and south of the valley of Selz. Again, here, as at Col di Lana, the enemy opened fire with batteries of every calibre with short intermittance during which there were always new infantry attacks.

Altogether in the actions of this second period the Italians captured 1,300 prisoners, including 40 officers, besides 2 guns, 12 mitrailleuses, some thousands of rifles, a great quantity of ammunition, bombs, and all kinds of war material.

* * *

During this period aerial warfare regained a development similar to that at the commencement of hostilities, with a constant tendency on the enemy's part to destroy buildings and inhabitants. The first attack took place on the 26th March. Three squadrons, two of 6 aeroplanes and one of 12 hydroplanes, with actions converging on Trento, Pergine, Gorizia, and Pola, attempted to shower bombs on the barracks and huts of the Italian army. But owing to the admirable organization of the aerial defences, the operations with which they sought to sow ruin and death on the barracks, etc., were completely unsuccessful. The enemy's aeroplanes exposed to the fire of artillery and rifles, and attacked by pursuing air squadrons, were everywhere dispersed and put to flight and four were beaten down causing death or the capture of the aviators.

On the following days the enemy's attempts at aerial incursions were also repulsed and dispersed; an Austrian aeroplane was beaten down near the island Morosini (Lower Isonzo); on the 4th two others, struck by our anti-aerial artillery, were seen to fall in enemy's lines.

The Italian aviators also passed to the attack. On the night of the 2nd during a strong wind, an Italian dirigible passed over Opcina, an im-

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portant railway junction on the railway line of Trieste, and destroyed 800 kilogrammes of explosives, and causing fires in the great depôts of provisions. Many other aerial attacks were carried out successfully. On the other hand the enemy attempted two incursions at night with hydroplanes, the first on the night of the 11th against Grado which were quite unsuccessful; the second on the night of the 18th against Treviso, and other small localities on the Venetian plain on which they threw 30 bombs killing 10 persons and wounding 20. On their return one of the enemy's hydroplanes was beaten down at Grado and the aviators were made prisoners.

On the afternoon of the 20th a squadron of aeroplanes attacked in the port of Trieste, the arsenal of the Austrian Lloyd's, bombarding it and causing great destruction. Only two of the enemy's hydroplanes succeeded in escaping the ruin by taking refuge at sea. From this day the enemy's aerial activity was limited to timid incursions of aeroplanes flying rapidly before fire aimed at them and threatened by aviators. Altogether in this brilliant period of aerial warfare the enemy lost 13 aeroplanes, besides the hydroplanes destroyed at Trieste. On the Italian side there were no losses.

E. T. THACKERAY.

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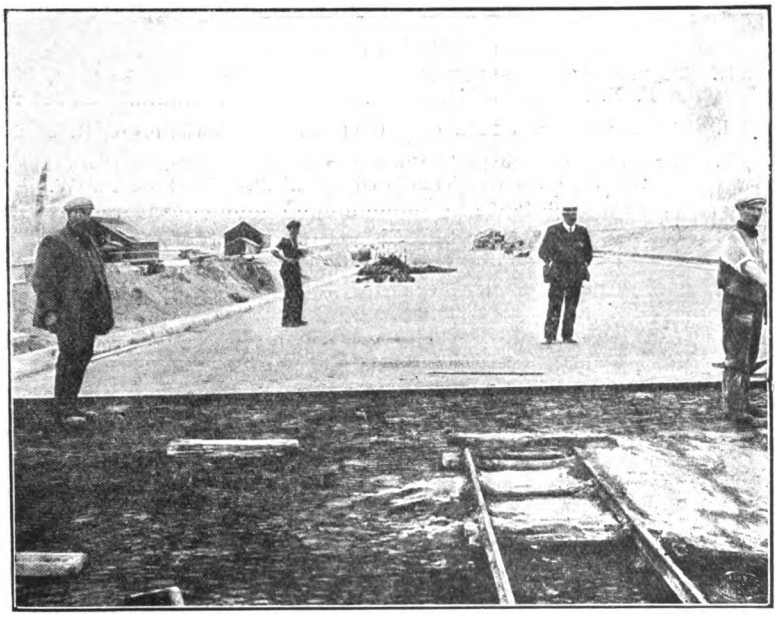

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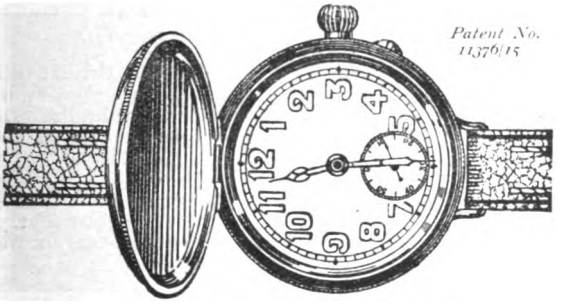

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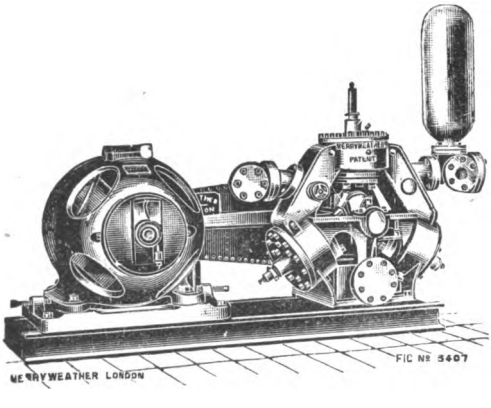

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FAMOUS ENGINEERS OF THE ALLIED ARMIES.

JOFFRE.

By COLONEL B. R. WARD, R.E.

CONTEMPORARIES of a great man are rarely able to appreciate the true foundation of his claim to greatness. They are apt to be dazzled by the more obvious and brilliant aspects of his character and achievements, and fail to see his true position in the great current of human history.

Thus Voltaire in the eyes of his contemporaries was a brilliant wit and controversialist, Rousseau an eloquent writer on social subjects, Napoleon a supreme master of the art of war. Only the obvious characteristics of these three great men were clearly visible to their contemporaries.

Macaulay's magnificent appreciation of Voltaire was written more than fifty years after the death of the famous writer, and shows clearly that a political thinker, writing at so late a date as the middle of the 19th century, was unable even approximately to appraise the value of the work of his great predecessor.

"If thou wouldst view," writes Macaulay in that astonishing style of his, which here at least reaches the very high-water mark of rhetorical verse,

> "If thou wouldst view one more than man, and less,
> Made up of mean and great, of foul and fair,
> Look here, and weep and laugh and curse and bless,
> And spurn and worship, for thou seest Voltaire.
>
> "That flashing eye blasted the conqueror's spear,
> The monarch's sceptre and the Jesuit's beads,
> And every wrinkle in that haggard sneer
> Has been the grave of dynasties and creeds.
>
> "In very wantonnness of childish mirth
> He puffed bastilles and thrones and shrines away,
> Insulted Heaven and liberated earth.
> Was it for good or evil? Who shall say?"

It was not until long after the death of Napoleon—a man who in his youth had been saturated with the writings of Rousseau—that Sir William Napier, perhaps the greatest and certainly the most eloquent of military historians, could write of him as "the child and the champion of democracy."

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Now at last—in the year 1916—it is as clear as the sun in heaven that the real work of Voltaire, of Rousseau and of Napoleon was to range France on the side of Liberty and Democracy, before the commencement of the new era inaugurated by the World struggle which commenced in August, 1914, against Tyranny and Autocracy. Now that the lists have been marked out and the battle engaged, it is clear to all eyes—although we are contemporaries of the great soldier whose career we are now considering—that the *rôle* that General Joffre was destined to play in the world's history was that of the champion of civilization, the Joshua destined to lead the European nations into the new era of liberty foreseen by Voltaire and Rousseau and ushered in by Napoleon as the champion of the Revolution.

Joseph-Jacques-Césaire Joffre was born at Rivesaltes, in the old province of Rousillon, on the 12th January, 1852. This province exchanged Spanish for French rule in 1659 as the result of the Treaty of the Pyrenees. This treaty was the crowning success of Mazarin, the great minister of Louis XIV. The Roussillon people are mountaineers, and although they have been incorporated with France for over 200 years they speak a Catalan dialect closely akin to that spoken on the other side of the Pyrenees.

Joffre was one of eleven children, his father being a working cooper who owned a small patch of vineyard close to the town. Had it not been for a friendly uncle who was struck by his intelligence, Joffre would not have enjoyed the education which was his at the lycée in the neighbouring town of Perpignan.

Another Rivesaltes lad who was educated at the same school, and who has been his friend ever since, is the present General Roques. Roques, like Joffre, is a famous Engineer officer, and held the position of Minister of War before being appointed to the Command in the Field which he now holds.

That the French Commander-in-Chief and War Minister should both hail from the same little Rousillon town is a remarkable feather in the cap of Rivesaltes and the best possible justification of the policy of Mazarin.

At the age of 15½ Joseph Joffre, who displayed a remarkable aptitude for mathematics, was sent by his father to Paris, where, before the age of 18 he succeeded in passing 14th out of 132 students into the famous Engineering College known as the Ecole Polytechnique.

Although Joffre was the youngest cadet in the whole school, his high position on the list entitled him to the rank of Sergeant. Possibly his duties as a non-commissioned officer may have interfered somewhat with his opportunities for study, for he was only 35th on the list when he passed out.

Before this occurred, however, Joffre had passed through the most impressive experience of his life.

The Ecole had just broken up for the summer vacation of 1870 when war was declared against Prussia.

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Joffre was gazetted a Sub-Lieutenant of Engineers and appointed to one of the Paris forts for duty. Here he remained throughout the campaign and saw but little of the field operations.

The depth of the impression made upon him by the Terrible Year may, however, be gauged by the following extract of an Army Order issued by him after the Battle of the Marne.

" As for me," he wrote, " if I have done any good I am rewarded by the greatest honour that ever came to me during my whole career, the honour of commanding men like you. It is with deep emotion that I tender you my thanks for what you have done : I owe to you the realization of that towards which all my energies have been continuously strained for the last four-and-forty years, I mean the Revanche of 1870."

After the War Joffre went back to the Ecole Polytechnique to complete his studies, and on the 21st September, 1872, he graduated 35th on the list as a Lieutenant of Engineers.

His early career in the Service was uneventful. He was employed in the construction of one of the new Paris forts ; later on he took a hand in barrack building in Brittany, and was afterwards for several years employed at the Ecole du Génie at Montpellier.

He was gazetted Captain on the 22nd April, 1876 ; and early in 1884, just after the death of his young wife, he applied for a mission in Indo-China. Here he was employed under Admiral Courbet, who appointed him Chief of the Engineering Department at Hanoi, and recommended him for the decoration of the Legion of Honour.

Four years later he returned to France, was promoted to the rank of Major and was employed in the military railway service for a short time until appointed Professor of Fortification at Fontainebleau. In 1892 he was ordered to proceed to the Soudan in order to superintend the construction of a railway in the Sahara from Kayes to Bafoulabe.

It was during this period that he undertook and carried to a successful conclusion a long march of 500 miles from Segou to Timbuctoo through a hostile country, and firmly established French authority over the wild tribes of the Sahara.

This well-organized and successful expedition made a great stir in France at the time, and has been recorded by Joffre himself in the form of a report published by him in the *Revue de Génie* in 1895 under the title : " Operations of the Joffre Column before and after the Taking of Timbuctoo."

The style of this report is interesting as revealing something of the personality of the man. It is entirely devoid of any straining after literary effect, is severely practical, and the whole report shows its author to be not only an organizer and leader of men, but also a master of intricate detail.

In March, 1894, while still at Timbuctoo, Joffre was promoted

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Lieutenant-Colonel and was transferred to Madagascar where, under orders of General Gallieni, the Governor, he carried out the extensive fortifications of Diego-Suares, at the extreme northern point of the island.

On his return to France in 1897 he was promoted to the rank of Colonel, and in 1901 he was gazetted Brigadier-General. From this time forward his promotion was exceptionally rapid. At first he commanded the Artillery at Vincennes. In 1905 he was given the command of a division whose headquarters were in Paris, and at the same time he was appointed member of the Technical Engineering Commission. In 1909 he commanded the Second Army Corps at Amiens, and made frequent visits to Paris as Inspector of the Military Colleges.

Lastly in 1910 he became a member of the Superior War Council. This Council consists only of eleven members. The Minister of War is President of the Council, the Vice-President being the officer designated to act as Generalissimo in the event of war.

In 1911—the year of the Agadir affair—the Vice-Presidency was offered to General Pau, a distinguished soldier who had lost an arm in 1870. In view of the fact, however, that he was due to retire in 1913 at the age of 65, General Pau suggested that a younger General should be appointed, and recommended Joffre—then 59 years of age—as the best man in every way for the post. Thus it came about that for three years before the outbreak of War Joffre was designated to command the French armies in the event of a European conflagration.

The work done by Joffre at the War Office during those three years can only be partially guessed at, but the principles that guided him in his administration of the Army can be discovered from his occasional speeches and interviews.

The principles of the French General Staff are no secret to military students. The voluminous literature that marks the labours of the Historical Section of the French General Staff during the last 30 years—largely under the direction of General Bounal—leaves no doubt as to the trend of French military thought since 1870, and constitutes by far the most important national contribution to the study of war that has been made during the last half-century.

It is not too much to say that French logic and clear thinking—as a result of the disasters of 1870—have, by rediscovering the Napoleonic secret, placed the philosophy and science of war on a firm foundation. "Read and re-read," said Napoleon in one of those sentences that have become embedded in the consciousness of all students of war. "Read and re-read the campaigns of Alexander, of Hannibal, of Cæsar, of Gustavus, of Turenne and of Frederick. Mould your thoughts by means of theirs. Only by this means will you be able to hit upon—*surprendre*—the secret of war."

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It is not every student who by studying the works of Quintus Curtius, of Arrian, and of Plutarch could arrive at the principles acted upon by Alexander during his military career.

The biography of Quintus Curtius entitled " The Deeds of Alexander the Great " consists of ten books, of which the first two are entirely lost, and the remaining eight are incomplete.

Add to this that the author was a rhetorician who flourished during the first century A.D., that is to say three centuries after the death of Alexander, that the work is uncritical, and that although written in a picturesque style it displays considerable ignorance of geography, chronology, and military matters.

In the short *Life of Alexander* written by Plutarch as one of his famous 46 Greek and Roman " Parallel Lives," he compares him with Julius Cæsar. Plutarch's *Life of Alexander* was written during the 1st century A.D., and was therefore contemporaneous with the biography of Quintus Curtius.

Arrian's work, *The Campaigns of Alexander*, was written a century later than the biographies of Quintus Curtius and Plutarch. It consists of seven books and is a history of Alexander from his accession to his death. Arrian's chief authorities were Aristobulus and Ptolemy, both of whom accompanied Alexander during his campaigns.

Arrian was the first Greek to whom an important Roman military command was ever given. He therefore possesses the qualification of having at one time himself served as a soldier, which makes him superior both to Quintus Curtius and to Plutarch as an interpreter of the great king. His work, which has come down to us in its complete form, consists of seven books and is the most complete and trustworthy account of Alexander that we possess.

It would be difficult after a study of the three foregoing authorities to re-discover the " secret of war " which according to the saying of Napoleon is to be found from a study of the campaigns of Alexander.

It would be still more difficult to discover this secret by studying what Polybius—a Roman enemy—has to tell us of the campaigns of Hannibal.

It would require the sympathetic insight of another great captain to penetrate across the centuries the guiding principles of Alexander and of Hannibal.

Napoleon himself undoubtedly possessed this sympathetic insight, for on one occasion he stated that he had no doubt in his mind that Hannibal was the greatest soldier of whom we possess any record, and on another occasion he complained that he knew of no living contemporary who could sympathize with Alexander.

It is therefore necessary for us moderns to read and re-read the campaigns of Napoleon himself if we wish to penetrate the secret of war.

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The records of Alexander and of Hannibal are too scanty and too remote, and the contemporary records too few even in the case of Frederick for us to be able to discover with any scientific confidence the guiding principles of these great soldiers.

It was therefore a wise decision on the part of the French military authorities after the disasters of 1870 to entrust to a specially appointed Historical Section of the General Staff a report of the principal military operations conducted by Napoleon in order to arrive at the principles that guided his action at critical moments.

The result of this study—made with all the rigid accuracy and reference to contemporary documents required by modern scientific historical research—is set out at large in the series of Napoleonic studies produced under the editorship of General Bonnal between the years 1889 and 1895.

The first study is entitled :—*The Spirit of Modern War. From Rosbach to Ulm.*

The others came out in the following order :—

La Manœuvre d'Iena. A study of the strategy of Napoleon and his military psychology from the 5th September to the 14th October, 1806.

La Manœuvre de Landshut. A study of the strategy of Napoleon and his military psychology from the middle of the year 1808 to the 30th April, 1809.

La Manœuvre de Vilna. A study of the strategy of Napoleon and his military psychology from January, 1811, to July, 1812.

These books were not given to the world until 1903 when *Rosbach to Ulm* was published. In 1904 *La Manœuvre d'Iena* appeared, and in 1905 the studies on Landshut and Vilna.

It is no exaggeration to say that the modern French "Doctrine of War" has been dug out of the brain of Napoleon by patient historical research illuminated by occasional flashes of genius.

The evolution of this science—for it is a science as well as a doctrine—can perhaps be most clearly seen in the writings of General Bonnal, the leader of the French military historical students, and from the essays of Captain Gilbert, perhaps the most brilliant member of the famous group.

It is however possible to reconstruct the entire French Doctrine of War from the words and actions of General Joffre.

In 1913, he delivered before the cadets of the Ecole Polytechnique an address which has since become famous.

In the following sentences he lays down with burning emphasis and transparent sincerity his faith in the necessity for a thorough organization of the entire *personnel* and *matériel* of the nation in order to ensure victory.

"To be ready," he said, "means nowadays a degree of preparation which those who conducted past wars could hardly conceive.

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It would be an illusion to reckon on the impetus of the masses, even if it were to leave behind that of the Volunteers of the Revolutionary Wars, unless it is helped by organization. To be ready means to have turned all the resources of the nation, all its intelligence, all its energy, towards the one object—victory. Everything must be foreseen, no extemporizing will avail; what will be lacking at the declaration of war will remain lacking, and the least gap may cause a disaster."

The foregoing words may be taken as a general statement of the objects and scope of French military science. By analyzing its generalities, and by comparing it with other French writings we may with some confidence reduce the science to an axiom and three principles.

The axiom on which the science rests is to the effect that the training of the individual soldier is the solid foundation on which victory must be based.

In an interview accorded to an American writer, Mr. Owen Johnson, General Joffre explained that in a Republic where the need of individual liberty is always strong, military service gives the citizen a quality of self-discipline which he needs in order to respect the rights of others, as well as to act in organized bodies. He went on to say that if America dreaded military service, it was because the citizen had his eyes fixed on the German ideal rather than on the French. The German system made a man into a machine. It was based on fear, and robbed him of his initiative. The German system was the revolver at the head, the French the word of encouragement, the smile, the *bonne camaraderie*.

If the axiom of the science may be described as the training and the tuning up of the individual soldier so that he may respond to the appeal of the averagely good Commanding Officer or General, its first principle may be said to be the efficient co-ordination of organization, training and fighting power which is the result of patient thought, plan, and action on the part of the responsible authorities.

In a speech delivered by him in 1913 to the Old Boys of the Ecole Polytechnique, General Joffre made use of the following words :—

"Neither the material organization of the army nor its training would suffice to assure victory, if to this intelligent and strong body a soul were lacking. This soul is Patriotism."

Only by the combination of organization, administration and fighting capacity, he seems to say, brought to its highest pitch of efficiency by the fire of patriotism, can death be defied, reverses be borne and victory ultimately be attained.

Another aspect of this principle is seen in the well-known sequence, *Prise de Contact*, *Fixation*, and *Exécution*, by means of which words the French General Staff indicate the dynamic sequence of events which Napoleon consciously controlled in order to achieve victory.

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The second principle of the science is so to distribute the duties and to arrange for their execution, that due weight shall be given both to centralization and decentralization, thus ensuring a minimum of friction in all military action.

This principle goes to the root of French army discipline.

"Though the French *pioupiou* is readily accessible to daring," writes Mr. Charles Dawbarn in *Joffre and His Army* "and glories in a passionate achievement, he is not hypnotized by names, but demands a real aristocracy. It is an error to suppose that he resents superiority. On the contrary, he is constantly looking for it and is eager to recognize it when found. He is equally impressed by it, whether he finds it in the plain features of Dupont or in the aristocratic mien of De Rochefoucauld. The name matters nothing; the qualities are everything."

In other words the genuine leader of men who knows how to centralize and when to decentralize, how to command and when to unbend, will obtain the greatest results from his men.

Mr. Herbert Ward, in his interesting study of the French soldier published under the title *Mr. Poilu: Notes and Sketches with the Fighting French*, compares the delicate balance of authority and obedience which can be seen in the French Army to-day to that which obtains in happy family life.

The French Army reminds him "of a family wherein the father ranks as the General, the elder brothers as officers, and the rest of the children are the soldiers. My reason for comparing the system of the French Army with that of family life is the sympathetic understanding which exists among French soldiers of all ranks. One never sees any signs of swaggering or haughty bearing among the officers. There is no arrogance; everywhere there is simple equality. I feel that I am on safe ground when I affirm that the tenacity and patience of the French Army—those very qualities that have gained the admiration of the whole world—are largely due to this paternal system." General Joffre himself exhibits this quality in a supreme degree. To the armies of France, he is not only "Mon Général," he is "Grandpère Joffre," and the man who can thus inspire both confidence and affection can move more than mountains—he can move armies to victory.

Lastly the most ruthless application of the principle of selecting the efficient and displacing the unfit has been exhibited by General Joffre when, after the Battle of Charleroi, 150 Generals were placed on the retired list. "Some were my best friends," said General Joffre, "but if I am fond of my friends, I am still fonder of France."

Such is the doctrine of war as exhibited by the words and actions of the great Engineer whose career is now being followed with feelings of confidence and hope by members of the allied and neutral

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nations. It is felt instinctively by all that victory must follow so thorough-going an exponent of the true doctrine of war.

The strongest possible proof that the French doctrine of war is sound is to be found in the fact that all the details of tactics as applied to modern trench warfare have been first worked out by the French Staff and have then been adopted by the other allied nations.

The great victory at Verdun of the 15th December, 1916, was a culminating example of economy and efficiency as applied to the attack of fortified positions.

Had the basic thinking of the French General Staff not been sound and thorough, they would not have been able to work out tactical details with such uniform thoroughness and success. The French tactical successes will doubtless now draw attention to French theories with a force that could not have been attained in any other way.

It is a new illustration of the old truth that " when the parts are in their places the whole is surveyed, and when the whole is surveyed new light is thrown on the parts."

" On the highest point of the Plateau de la Vierge," writes Mr. H. Warner Allen, in his interesting book, *The Unbroken Line*, " is perched a not particularly artistic monument with a Latin inscription : ' In memory of Jovinius who in 366 overthrew the barbarians from Germany.' Perhaps some day," continues Mr. Allen, " the name of Joffre will be added to that inscription."

That General Joffre himself has no doubt whatever as to the ultimate issue of the War may be seen from the stirring Army Order published by him on the 1st August, 1916. The Order runs as follows :—

" Soldiers of the Republic,—You are about to enter upon the third year of the War.

" For two years you have sustained without flinching an implacable onslaught.

" You have wrecked all the plans of our enemies. You have conquered them on the Marne, stopped them on the Yser, and beat them in Artois and Champagne, while they vainly strove for victory on the Russian plains. Now, after your heroic resistance in the five months' battle, you have smashed the German effort before Verdun.

" Thanks to your steadfast courage, the armies of our Allies have been able to forge weapons of which our enemies are to-day feeling the weight on all fronts. The time is coming when the military power of Germany will collapse under the general pressure.

" Soldiers of France, you may be proud of the work you have already accomplished. You are determined to complete it. Victory is certain."

The Teuton power has shown during the present War many of the authentic marks of the Apocalyptic Beast.

The Belgian atrocities of August, 1914, and the burning of Lou-

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vain first revealed to our careless and easy-going civilization the true inwardness of the "furor Teutonicus." The sinking of the *Lusitania*, the prison camp of Wittenberg, the shooting of Edith Cavell, and the French and Belgian deportations of 1916, have at last convinced a sceptical world that no sign is wanting to identify the Blonde Beast of Teutonism with the foul dragon of the Apocalypse.

The chosen symbol of the Teutonic Empire—an eagle—is now seen to be in reality a vulture, not the noble monarch of the air, but a foul bird of prey. France has known this for more than a century, and for more than 40 years France has trained herself by study and practice to be the champion of civilization. France has played this part before. "History, which opens up the Pantheon of Time, shows imprinted on the two heads of the Vulture of Germany, the Sandal of Charlemagne and the Spur of Napoleon."*

The two-headed vulture of Germany is destined to bear another mark—this time over the heart—the rapier thrust of France, the "Exécution" of the French General Staff, pressed home by the hand of the greatest of modern soldiers, the latest Marshal of France, Joseph Joffre.

UYEHARA.

By MAJOR F. S. G. PIGGOTT, D.S.O., R.E.

GENERAL BARON YUSAKU UYEHARA, Chief of the Japanese General Staff, was born on the 9th November, 1856, in Miyazaki Ken, Kyushu, and obtained his commission in the Engineers of the Imperial Japanese Army on 22nd December, 1880.

Passing through the regular grades of Lieutenant, Captain, Major, Lieut.-Colonel, and Colonel, he attained the rank of Major-General in 1900, Lieut.-General in 1906, and General in 1915.

During the Chino-Japanese War of 1894–5, he served on the General Staff of the First Japanese Army, and was present at the Battle of Ping-Yang, and other engagements.

During the Boxer Rising of 1900, when Japanese troops first fought side by side with European Armies, he occupied the important post of Director of Transport at the War Office. Three years later he was one of the Japanese delegates at the Hague Peace Conference.

* "L'histoire, qui des temps ouvre le Panthéon,
Montre empreints aux deux frouts du vantour d'Allemagne,
La sandale de Charlemagne,
L'éperon de Napoleon."

VICTOR HUGO.

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In the Russo-Japanese War of 1904–5, he was Chief of the General Staff of the Fourth Japanese Army (under the late Marshal Count Nodzu), being present at the Battles of Liaoyang, the Sha-ho, and Mukden, as well as at numerous lesser actions.

But it is during the last six years that he has come very specially to the fore, having occupied in succession the posts of Inspector of Engineers, Minister of War,* Inspector-General of Military Education, and Chief of the General Staff. The latter post he holds to-day.

It was during his tenure of the appointment of Minister of War (1912—1913) that the Bill providing for an increase of two divisions to the Japanese Army was first brought before the Cabinet; its rejection by the Premier (Marquis Saionji) led to the fall of the Government, for General Uyehara resigned his portfolio, and no one could be found to succeed him.† It was not until two years later that the measure passed through the Diet.

During the Siege of Tsing-Tau in 1914, General Uyehara was Inspector-General of Military Education in Tokyo; the results of his work were plainly visible during that short but brilliant campaign—a model example of the siege of a first-class fortress, coupled with disembarkation problems of both *personnel* and *matériel*, involving a very high standard of technical training. It was shortly after the fall of Tsing-Tau that he became Chief of the General Staff.

Reserved and taciturn in manner, his forceful personality is very well-known in the Japanese Army. A member of the famous Satsuma Clan, he has all the Japanese natural aptitude for soldiering, and has added to it a keen study of modern strategy and tactics; while his early training in the scientific branch of the army has enabled him to keep abreast of the latest development in artillery and engineering problems. Not only on account of his ability, but also by reason of the respect and admiration of his countrymen, he is a worthy successor to the giants of old—the late General Viscount Kawakami, the late Marshal Prince Oyama, Marshal Prince Yamagata, and Marshal Count Terauchi—the last two of whom are, happily, still serving their country.‡

* The late Lieut.-General Baron Ishimoto, another Engineer officer, held the post of Minister of War from 1910—1911.

† The Japanese Constitution provides that the Portfolio of the War Department must be held by a General or Lieut.-General on the Active List.

‡ Count Terauchi became Prime Minister of Japan in October, 1916, in succession to Marquis Okuma. During the Russo-Japanese War he was Minister of War.

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For his services to the State, H.I.M. the Emperor of Japan has conferred on him, from time to time, the following decorations :—

1st Class Order of the Rising Sun.
1st Class Order of the Sacred Treasure.
2nd Class Order of the Golden Kite.

In 1897 he was created a baron.

General Uyehara has travelled extensively in Europe, and knows France intimately, having studied her military system, and language, when a young officer.

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*DEEDS OF THE ROYAL ENGINEERS.**

CHAPTER I.

A SHORT HISTORY OF MILITARY ENGINEERS IN ENGLAND.

THE first employment of Military Engineers in this country dates from a very early period of English history.

In Domesday Book, which was compiled in the 11th century soon after the Norman Conquest, will be found the name Waldivus, followed by the title Ingeniator, or Military Engineer. In direct succession from the Ingeniator of William the Conqueror we can trace an unbroken line of military engineers in this country, extending over a period of more than eight centuries.

From the 11th century to the 18th century all Engineers were Military. Sometimes military and episcopal duties were combined. Thus Gundulph, Bishop of Rochester, constructed the Norman keep adjoining his Cathedral, and commenced the still more famous "White Tower"—the keep of the Tower of London—towards the close of the 11th century. Gundulph was the most famous of the early military engineers, who were not only "the builders of castles and defensible strongholds, but also the inventors, manufacturers, and directors in action of engines of war, with which to attack or defend them."

During the period following the Norman Conquest, castles were built at points of strategic importance, chiefly on the great roads and waterways, to strengthen invaders hold on the conquered country.

A square tower in an enclosure surrounded by a bank and palisade was the usual pattern, until the Crusades made English engineers familiar with the elaborations of the Byzantine military science, which had developed in an unbroken line from the days of the Cæsars. A second and third line of defences was added to the enclosure and projecting towers, flanking the wall. Engines which threw huge weights and liquid fire were used, but the mine and the ram were the most effective weapons. Round instead of square towers were adopted as offering less hold to the ram in the concentric castles of this period, such as are still to be seen at Conway and Caernarvon, built by Edward I. to hold down Wales.

* Compiled in the R.E. Record Office.

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So little serious fighting took place in England after the early Middle Ages that when the development of artillery made the old fortresses obsolete, they fell into ruin and nothing of any importance took their place. A few coast-defence castles were erected by Henry VIII., but the further development of fortification must be followed overseas.

It is a curious coincidence that the modern School of Military Engineering should have been erected within view of Rochester Castle, the work of the most famous of our early forbears. "By the middle of the 13th century there existed an organized body of skilled workmen, employed under a Chief Engineer. At the Siege of Calais in 1347 this Corps consisted of masons, carpenters, smiths, tentmakers, armourers, gunners, and artillerymen. At the Siege of Harfleur, in 1415, the Chief Engineer of Henry V. was designated Master of the King's Works, Guns, and Ordnance, and the Corps under him numbered 500 men, including 21 foot-archers. Headquarters of Engineers existed at the Tower of London before 1350, and a century later developed into the Office of Ordnance (afterwards the Board of Ordnance), whose duty was to administer all matters connected with fortifications, artillery and ordnance stores."*

In the early part of the 18th century engines of war were beginning to be sufficiently numerous and complex to justify their organization into a separate arm. During campaigns conducted by the Duke of Marlborough, the Chief Engineer was, however, still in command of the "Ordnance Train" as the Artillery was then usually designated, and it was not until after the rebellion of 1715 that it was decided to separate the Artillery from the Engineers, and to bring definitely into being the third arm, the Artillery, with which the Engineers are still so closely connected, and whose history is thus seen to have been identical with our own in its origin, and for the first six centuries of its existence.

A Royal Warrant of the 26th May, 1715, established, on the one hand, two companies of Artillery as a separate regiment, and, on the other hand, an Engineer corps, which consisted of officers only, under a Chief Engineer. For a period of 56 years, *i.e.* from 1716 till 1772, the Corps of Engineers were without any rank and file, all the rank and file of the old Ordnance Corps having apparently been allotted in 1716 to the Artillery. On the 6th March, 1772, this state of things was, however, remedied by Sir William Green, then Chief Engineer of Gibraltar, by the formation of "The Company of Soldier Artificers," the officers being furnished by the Corps of Engineers.

On the 25th April, 1787, the designation of Royal was conferred upon the Engineers, and on the 10th October of the same year "The

* *Encyclopædia Britannica*, 10th Ed., Vol. 28, p. 173.

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Corps of Royal Military Artificers," consisting of six companies, was established. The distinction "Royal" was doubtless conferred upon both Engineers and Artificers in consequence of the distinguished services rendered by them during the successful defence of Gibraltar in the years 1779 to 1783.

In 1806 the establishment of the "Royal Military Artificers" was raised to 12 companies, and in 1811 to 32 companies. During the latter year Sir Charles Pasley, then a Captain of Royal Engineers, was in command of a company of Royal Military Artificers at Plymouth. None of the Artificers had up to this time been employed in the Peninsular War, although the need for trained Sappers was glaringly apparent. Capt. Pasley, by the system of instruction employed by him at Plymouth, showed how the non-commissioned officers and men of the Artificers could be turned into most valuable assistants to Engineer officers in time of war by making use of their superior intelligence, in order to assist the officers in laying out batteries, superintending working parties, etc.

When, therefore, on the 7th April, 1812, just after the Siege of Badajos, the Duke of Wellington wrote to the home authorities, urging in the strongest possible terms the absolute necessity for a corps of trained Sappers, no time was lost in establishing a School of Instruction in Fieldworks, and in giving the Artificers the more martial designation of "Royal Sappers and Miners." Thus, by the Royal Warrant of the 23rd April, 1812, was organized at Chatham the Royal Engineers Establishment, now known as the School of Military Engineering, for the instruction of officers and men "in duties of sapping, mining, and other military fieldworks." Lieut.-Colonel Pasley was the first Director of the Establishment and presided over its destinies for the long period of 29 years.

On the 12th October, 1856, at the close of the Crimean War, the connection between the rank and file of the "Royal Sappers and Miners" and the officers of the "Royal Engineers" was made permanent by the incorporation of the two bodies into one corps, known henceforward as "The Corps of the Royal Engineers."

The first title borne by the rank and file, the "Company of Soldier Artificers," raised by Sir William Green in 1772, laid special stress on the character of the men as artisans.

The change of name from Royal Military Artificers to Royal Sappers and Miners in 1813 emphasized the work of the Corps in field engineering. This innovation will always be connected with the name of Sir Charles Pasley.

The last change of name, from "Royal Sappers and Miners" to "Royal Engineers," welded the Corps into a military unity and emphasized the soldierly aspect of the Sapper's character. This change took place in 1856, just after the Crimean War.

The training as soldiers pure and simple, although of course

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carried out from the earliest times, was not in point of fact specially emphasized until the necessity for a more rigid system of discipline was acknowledged by Sir John Burgoyne in recommending a great soldier, Sir Lintorn Simmons, for the post of Director of the R.E. Establishment in 1865, and again by the appointment of Colonel Fitzroy Somerset as Superintendent of Military Discipline in 1867. At this time Sir John Burgoyne, as Inspector-General of Fortifications, was the official head of the Corps. It may, therefore, fairly be said that, just as we owe the raising of a technical corps, The Royal Military Artificers, to Sir William Green, and the training in siege works and field engineering generally to Sir Charles Pasley, it is to the greatest of them all, Sir John Burgoyne, that we owe the military spirit which has made the Corps an integral part of the British Army.

It will be seen from the foregoing short sketch that there are four main periods into which our history may be divided.

1.—From the time of the Norman Conquest to the 18th century. The ancient period.

2.—From 1772 to 1813. The period of Sir William Green and the Royal Military Artificers.

3.—From 1813 to 1856. The period of Sir Charles Pasley and the Royal Sappers and Miners.

4.—From 1856 to the present day. The period of the Royal Engineers. The first great name of this period is that of Sir John Burgoyne, the first field marshal from the ranks of the Royal Engineers. The last great name is that of Earl Kitchener, Secretary of State for War, our fourth field marshal, who was drowned at sea on the 5th June, 1916, while proceeding on a mission to the Emperor of Russia.

The foregoing four points are all brought out in a very condensed history which is enfaced on a picture postcard published by Messrs. Gale & Polden, doubtless on sale at most R.E. stations.

A lantern lecture illustrative of Corps history is periodically given at Chatham to the recruits of the Reserve Battalion. If officers require the loan of slides for similar lectures at other stations, the Commandant of the School of Military Engineering will as far as possible meet their wishes, if application is made to him.

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Chapter II.

THE SOLDIER ARTIFICER COMPANY AT THE SIEGE OF GIBRALTAR.

The military importance of Gibraltar was recognized from the earliest times. The first record of its having been used for military purposes was in A.D. 711, when it was used by the Moors as a base for their successful invasion of Spain.

Through the centuries the fortress underwent twelve sieges with varying fortunes before it passed into the possession of Great Britain in 1704. On the 24th July of that year it was captured by the allied British and Dutch forces during the War of the Spanish Succession and it has remained a British possession ever since. The last siege of Gibraltar by the Spaniards in 1779—1783, when Great Britain was at war with France, Spain, Holland and the revolted American Colonies, was one of the most memorable sieges in history.

The Spaniards had always been impressed with the desirability of recovering possession of the Rock, and although they had been defeated three times in their efforts to regain it, they determined to select this most embarrassing moment for Great Britain, for another attempt, and duly declared war.

At this date the garrison consisted of :—

6 companies of Artillery,
8 regiments of the Line,
1 company of Soldier Artificers commanded by Engineers,

a total of 5,382 of all ranks under the command of the Governor. The company of Artificers consisted of 9 officers and 114 rank and file. The 9 officers were :—

Colonel W. Green, Chief Engineer.
Capt. John Phipps.
Capt.-Lieut. John Evelegh.
First Lieut. William Booth.
Second Lieut. W. Mackerass.
Second Lieut. Thos. Skinner.
Second Lieut. John Johnson.
Second Lieut. Charles Holloway.
Second Lieut. Lewis Hay.

The following Assistant Engineers were appointed in July :—

Lieut. Burton, R.A.
Lieut. Chambre, 56th Regt.
Lieut. Alt, 72nd Regt.
Lieut. Schants, Hardenburg's Regt.

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The formation of the Company of Soldier Artificers at Gibraltar, the forerunners of the rank and file of what is now known as the Corps of Royal Engineers, was brought about in the following way:—

After the siege of 1727 the fortifications of Gibraltar had been allowed to fall into a very dilapidated condition. Up to 1772 the works of repair, etc., were mainly executed by civil mechanics from the Continent and England. Not being amenable to military discipline these men were indolent and disorderly, with the result that the works progressed very slowly, imposing much trouble and anxiety on the officers. In 1772, Lieut.-Colonel William Green, the Chief Engineer of the Fortress, suggested the formation of a company of military artificers as the only means of executing the necessary works. In due course the Royal consent was given in a warrant dated 6th March, 1772, which authorized the raising and forming of a company of artificers with a total establishment of 68 N.C.O.'s and men. Officers of the Corps of Engineers were appointed to command this new body which was given the name of "The Soldier Artificer Company."

They soon justified their existence and in 1775 General Boyd, the Lieut.-Governor, in asking that their numbers should be increased stated that "we can depend only upon the Artificer Company for constant work and on soldiers occasionally. Had it not been for the Artificer Company, we should not have made half the progress in the King's Bastion as well as in other works of the garrison."

The work of repair, etc., progressed rapidly, but in 1779 when the last and most memorable siege commenced, the damage caused by neglect and previous sieges had not been entirely made good.

During June and July of that year communication with the Rock was severed and both sides engaged themselves diligently in preparation. In the fortress great depôts of earth were collected in several places, hogsheads and casks prepared for use in repairing the fortifications, and other precautions taken for the defence of the place by strong parties of infantry acting under the direction of the Engineers. About 300 Jews and Genoese were also employed by the Engineers.

At the end of July General Elliott, the Governor, appointed Capt. Evelegh to his staff to act as an additional A.D.C. to himself as Commander-in-Chief.

In August things began to look serious, and where the garrison's efforts had been active they now became intense. It is recorded that this was largely promoted by the example of the Governor himself, who never spared himself, and usually commenced his day by being present when the workmen paraded at dawn.

The Governor, who had himself risen from the ranks of the Engineers, was General George Augustus Elliott, afterwards Lord Heathfield. He had served for many years as an Engineer, his first com-

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mission as Practitioner being dated 13th August, 1741. He was promoted Engineer Extraordinary in 1744 and Engineer in Ordinary in 1747. He had of late years abandoned the Corps and reverted to ordinary military duty; but his long training in this scientific branch of the Service proved of the utmost utility during the long siege.

It is noted that on the 20th July, according to an entry in a diary kept by Second Lieut. Holloway, "fresh beef was delivered out at 60 lbs. per regiment, the Artillery and Soldier Artificer Company being considered as equal to one" (regiment).

All this time the enemy confined himself to works of preparation and blockade, intending to reduce the fortress by famine. In this, however, he was disappointed; for the endurance of the garrison and the very occasional arrival of reliefs frustrated his object, and he was compelled to adopt a more difficult and expensive method. The privations of the garrison, however, were so severe that they were reduced to using thistles, dandelions, and other wild herbs to keep body and soul together.

In November the Spanish batteries presented so formidable an appearance that the Governor made a selection of the troops to assault and destroy them. To each of the right and centre columns a detachment of the Artificer Company, in all 12 N.C.O.'s and 40 privates, was attached under Lieuts. Skinner and Johnson, of the Engineers; and 160 working men of the Line regiments were told off to assist them. To the left column 100 sailors were told off to act as pioneers. The Soldier Artificers were supplied with hammers, axes, crowbars, fire faggots and other burning materials. At 3 a.m. on the 27th November, the sortie was made. The moment Lieut.-Colonel Hugo, who had charge of the right column, took possession of the parallel, Lieut. Johnson with the artificers and pioneers commenced with great promptitude and dexterity to dismantle the works. Similar daring efforts succeeded the rush of Lieut. Skinner's artificers and workmen into St. Carlo's battery.

General Elliott in his dispatch on this sortie observes, "The pioneers," meaning artificers, "and artillerists made wonderful exertions, and spread their fire with such amazing rapidity, that in half an hour, 2 mortar batteries of ten 13-in. mortars and 3 batteries of 6 guns each, with all the lines of approach, communication, traverses, etc., were in flames and reduced to ashes. Their mortars and cannon were spiked and their beds, carriages, and platforms destroyed. Their magazines blew up one after another as the fire approached them."

After the sortie the repairs to the defences at the North Front and other works of the fortress found full employment for the company. Sickness set in about this time, the garrison being ravaged first with smallpox and then with scurvy. Working parties were cur-

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tailed and men unused to hard labour and unskilled in the use of tools were employed to fill up the gaps caused by casualties. Much extra duty and exertion were thus thrown on the company, and though frequently exposed to imminent danger, they worked both night and day, with cheerfulness and zeal. No detailed record of the different services performed by the company has been preserved, but a reference to Drinkwater's *History of the Siege of Gibraltar* will afford some idea of their labours.

In May, 1782, the Governor, attended by the Chief Engineer and staff, inspected the batteries at the North Front. Great havoc had been made in some of them by the enemy's fire; and for the time they were abandoned whilst the Artificer Company were restoring them.

Meditating a few minutes over the ruins, he said aloud, "I will give a thousand dollars to anyone who suggests how I am to get a flanking fire upon the enemy's works." A pause followed, when Serjt.-Major Ince, of the Company, who was in attendance on the Chief Engineer, stepped forward and suggested the idea of forming galleries in the vertical north face of the rock to effect the desired object. The General at once saw the propriety of the scheme and directed it to be carried out.

On the 25th May, 12 good miners having been selected from the Artificer Company, they commenced, under the executive direction of Serjt.-Major Ince, to mine a gallery from a place above Farringdon's battery through the limestone rock to the notch or projection in the scarp under the Royal Battery. This gallery was 6 ft. wide and 6 ft. high.

On 5th July another gallery was commenced in compliance with the Chief Engineer's orders. This was also 6 ft. high and 6 ft. wide and ran through the rock from the cave at the head of the King's lines to the cave near the west end of the Queen's lines.

On 15th July the first embrasure was opened in the face of the rock communicating with the gallery above Farringdon's. To effect this, the mine was loaded with an unusual quantity of powder and the explosion was so loud that almost the whole of the enemy's camp turned out at the report. The gallery was now widened to admit of a gun being placed in it with sufficient room for its recoil, and when finished a 24-pounder was mounted. Before September, five heavy guns were placed in the gallery; and in little more than twelve months from the day it was commenced, it was pushed to the notch, where a battery, as originally proposed, was afterwards established and distinguished by the name of "St. George's Hall."

These galleries when completed after the siege comprised two ranges, the upper and lower (Windsor and Union Galleries), the latter being partly open and partly under cover, the upper range containing two magnificent halls, St. George's and Cornwallis. Below this upper

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line of galleries are others far more vast and wonderful in their construction ; these, too, have been hewn and blasted out of the tough limestone and are of marvellous size and strength.

In July, 1782, the company could only muster 92 men of all ranks including the sick and wounded. This was the more unfortunate as the siege was daily assuming a more serious aspect, the enemy collecting greater force and the effect of the cannonade upon the defences becoming more telling and ruinous. As the Governor's chief dependence rested on the Soldier Artificers for the execution and direction of the more important works, he was not only anxious for their completion to the authorized extablishment but convinced of the necessity of augmenting them. As soon, therefore, as an opportunity offered, he urgently requested the Duke of Richmond, then Master-General of the Ordnance, to fill up the company with mechanics from England, and also to make a liberal increase in its establishment. His Majesty subsequently issued a Warrant dated 31st August, 1782, ordering the company to be increased by 118 men. Its establishment now amounted to :—

1 Serjt.-Major.
10 Serjeants.
10 Corporals.
209 Working Men.
4 Drummers.

234 total.

In August, 1782, the firing of red-hot shot from the North Front commenced upon the enemy's batteries and caused an astonishing amount of destruction and panic. The bold attack of the garrison however aroused the Spaniards, who, quickly repairing their works, opened, on the next day, a sustained fire upon the Rock from 170 guns of large calibre. Nine line-of-battle ships also poured in their broadsides, in which they were assisted by 15 gun and mortar boats. Considerable injury was done to the North Front and also to the Montague and Orange Bastions, the obstructions and Landport were practically demolished and many other works nearly so.

The Engineers with the Artificers and workmen were unremitting in their exertions both night and day to restore the more important of the defences. At Landport, notwithstanding the heavy firing of the enemy, the carpenters of the company were constantly detached to repair the fresh recurring breaches, which, Drinkwater states, " were kept in a better state than might have been expected."

This attack, however, was only preliminary to the greater one which was to follow. The interval was filled up by the enemy in the discharge of cannon averaging 4,000 rounds in the 24 hours. On the 12th September the combined fleets of France and Spain arrived

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before the Rock with 10 floating batteries bearing 212 guns, while their land batteries mounted 200 heavy guns, and were protected by an army of 40,000 men. In less than 10 minutes the flotilla anchored and the garrison at once opened fire with all their available 96 guns. A tremendous rejoinder succeeded from over 200 pieces of the enemy's heaviest artillery. For hours the contest raged, but, at length, the red-hot shot used by the garrison took effect and sheets of flame burst out in all directions from the flotilla. By the 14th the whole of the floating batteries were burnt; their magazines blew up one after the other, and it was only the strenuous and merciful efforts of rescue by the garrison that prevented a colossal loss of life to the enemy by drowning.

Red-hot shot was the grand specific for repulsing this and other attacks. To supply it in sufficient quantities, the Company of Artificers erected kilns in various parts of the garrison. Each kiln was capable of heating 100 shots an hour. By this means, as Drinkwater writes, "the Artificers were enabled to supply the Artillery with a constant succession for the Ordnance."

For a few months the cannonade proceeded, but a trifle less briskly. During this time the Artificers under the Engineers were constantly engaged in the diversified works of the fortress and they began to rebuild the whole flank of the Orange Bastion on the sea line, 120 ft. in length. All the available masons and miners of the company were appointed to this important work. In the face of the enemy's artillery the Artificers continued fearlessly to erect the flank, and at last completed it in about three months, to the amazement and satisfaction of the Governor and the garrison. The erection of such a work, in solid masonry, and under such circumstances, is perhaps unprecedented in any siege, and is alike highly honourable to the Engineers and to the company.

The enemy having failed to reduce the fortress by blockade, by protracted bombardment or by combined attack by flotilla and land batteries, now tried a fourth stratagem, to mine a cave in the Rock by which to blow up the North Front and thus make a breach to facilitate their entrance into the fortress. When it is remembered that the Rock at this point shows a perpendicular face of nearly 1,400 ft. in height it will be realized how desperate the enemy had become. Information was first received of this enterprise from a deserter, but the news was treated with considerable incredulity. The enterprise of Serjt. Thomas Jackson, of the Artificer Company, however, dispelled all doubt. It was his duty to reconnoitre the North Front in addition to other services for which he was held responsible. Observing a certain activity on the part of the enemy at the Devil's Tower, he descended the steep and rugged rock by means of ropes and ladders. The attempt was as bold as it was hazardous. Stopped by an opening very near the base of the cliff,

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he explored the entrance and heard the sound of voices and the noise of hammers and picks. Climbing back again he reported what he had discovered.

Hand grenades and large stones were then frequently hurled over the precipice at this point. Although this vertical bombardment did not cause the enemy miners to relinquish their project, it greatly interrupted their progress.

The enemy still maintained a desultory artillery fire but their main energies were directed to the construction of the mine until the arrival of news from home of the signing of the preliminaries of a general peace. On the 5th February, 1783, the last shot in the conflict was fired from the fortress and the siege which had lasted nearly four years was over.

During the whole of the memorable defence the Company of Artificers earned golden opinions of all concerned and proved themselves to be good and brave soldiers as well as conspicuous for their skill, usefulness and industry.

Some time after the siege was over the expediency of increasing the establishment of military artificers was discussed in the House of Commons, and Capt. Luttrell then stated that " during the siege, the Company at Gibraltar had been found of infinite service."

The casualties in the company numbered 49, of whom 35 recovered. In addition 23 died of sickness.

During the siege 43 men deserted from the garrison, but not one was from the Artificer Company.

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History of the Siege of Gibraltar. By John Drinkwater.

History of the Royal Sappers & Miners. Vol. I. By T. Conolly.

History of the Corps of Royal Engineers. Vol. I. By Major-General Porter.

History of Gibraltar. By Capt. Sayer.

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THE MINERAL RESOURCES OF THE BRITISH EMPIRE.

A PAPER was recently read at the Apartments of the Geological Society, Burlington House, by Dr. C. Gilbert Cullis, Professor of Economic Mineralogy in the Imperial College of Science and Technology, on "The Mineral Resources of the British Empire with regard to the Production of the Non-Ferrous Industrial Metals."

The particular metals dealt with were: copper, lead, zinc, tin, and aluminium. The object was to demonstrate the Imperial position with regard to each of these, and to show in respect of which of them the Empire was, on the one hand, self-sufficing, or, on the other, dependent upon foreign countries. In the latter case, the extent of the dependence was indicated, and methods suggested by which it might be diminished.

The situation with regard to four out of the five metals was shown to be wanting in independence and security, and the necessity for a full investigation of the British mine and smelter productions was insisted upon.

With regard to copper, not only were the ore resources, as at present exploited, deficient, but the smelting facilities also were seriously inadequate for the Empire's metal requirements. The production both of ores and metal could be substantially increased by suitable organization and administration.

Lead and zinc ores, raised in British territory, had in the past been exported on a large scale to foreign countries, notably Germany and Belgium, for metal recovery, with the result that the Empire had been placed in an anomalous position of dependence which ought never to have arisen. The shortage of zinc, in the early days of the War, and the consequent jeopardizing of supplies of cartridge-brass were referred to. The mine production of lead and zinc was more than sufficient for the Empire's requirements, but the smelting facilities were lamentably deficient, especially in the case of zinc. It was urged that all the lead and zinc concentrates of Broken Hill should in future be smelted within the Empire.

In the case of aluminium, while the actual bauxite resources of the Empire were so small that dependence had to be placed upon the French or American deposits—which were being more and more utilized in their countries of origin—large potential supplies, in the form of laterite, had a very wide distribution in the tropical colonies, but were almost untouched and untried. The systematic examina-

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tion of these and other potential sources of aluminium, with a view to their utilization, was seriously needed.

The only metal with regard to which our position was really strong was tin. The British mine production of tin in 1912 was 66,000 metric tons out of a world's total of 125,000, and its smelter production 85,000. Estimating the consumption at 32,500 tons, there remained 53,000 tons for export. Now that the German market for Bolivian tin ore was closed, an opportunity had arisen of securing the whole of the Bolivian output for British smelting.

In a series of general conclusions, a plea was put forward for the elimination of wasteful methods in ore and metal recovery, for the fuller utilization of by-products from ores, and for the adoption of large-scale operations of high engineering efficiency by which capital and labour might be advantageously used. The widespread export of raw or partially smelted materials, produced within the Empire, to foreign countries for the recovery of the finished products was condemned, and the promotion of industries making for independence as regards essential products advocated.

The expediting of geological and mineral surveys of all British territory, and the organization of advance investigations with the object of improving current processes, or of discovering new ones by which geological materials hitherto unexploitable might be made productive, were urged.

The development of the mineral resources of the Empire had taken place in the past without any constructive Imperial policy: it had lacked co-ordination and control and was in need of scientific and business-like administration, and the suggestion that a Government Department of Minerals and Metals should be established to foster and safeguard mineral resources and to promote the welfare of related industries was strongly supported. If formed and properly conducted, such a department should do much to give security and order to what was now full of danger and disorder.

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REVIEW.

PAGES D'HISTOIRE, 1914—1915.

(Librairie Militaire Berger-Levrault, Paris : 5, Rue des Beaux-Arts).

The first 70 numbers of the *Pages d'Histoire* series have already been reviewed in the *R.E. Journal* since the first notice relating to this series appeared in the *Journal* for February, 1915.

The 71st number is entitled *Les Pages de Gloire de l'Armée Belge ;* the text is illustrated by four sketch-maps. In a preface to this number Major Willy Breton, of the Belgian Army, tells us that the contents of the volume have already appeared, from time to time, under the title " Pages de Gloire," in the *Courrier de l'Armée*, a publication produced for the benefit of the Belgian soldier.

The story of the heroic deeds of the Belgian Army is told in this volume in two parts ; the first part deals with the battles and engagements fought during the retreat of the Belgian Army from the Gette to the Yser and with the fighting which took place on the latter river in October and November, 1914, whilst the second part deals with the fighting round Dixmude in October, 1914. The pages of the little volume are full of interest and give in some detail an account of the deeds which have added to the renown of the Belgian soldiers. A perusal of these pages gives some idea of the tenacity of purpose, endurance and courage shown by the sons of Belgium, in their great, but unequal, struggle against a very powerful and unscrupulous aggressor.

The 72nd number is entitled *Chants de Soldats* and contains popular and military songs, dating from 1525 to the present day ; the French rendering of the National Anthems of France (the Marseillaise, composed in 1792), of Belgium (La Brabançonne), of Russia (composed in 1833), of Great Britain (composed in 1740), of Serbia, of Montenegro, and of Japan are included in this volume. The songs and national anthems are accompanied by the score of their tunes. This volume concludes with the score of the bugle calls of the French Army.

The 73rd number contains a French translation of certain despatches published in the British White Paper dealing with the crisis leading to the present War ; these despatches cover the period 20th July—1st September, 1914. In a preface to this volume it is stated that as the number of despatches in the White Paper in question were so numerous, the editors of the *Pages d'Histoire* decided, in the first instance, to publish only those which were of the greatest public interest. The selected despatches were published in the 15th number of the *Pages d'Histoire* series, and therefore the contents of the number under review are in the nature of a supplement to the despatches in the 15th number.

The 74th number is entitled *Voix Italiennes sur la Guerre de* 1914—

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1915. In a preface to this number the editor states that this collection of Italian views on the War differs in many particulars from the collection of American opinions which appear in the 36th and 37th numbers of the *Pages d'Histoire* series under the title *Voix Américaines sur la Guerre de* 1914—1915 (*vide R.E. Journal* for July, 1915).

In the volume now under review considerable prominence has been given to the individuality of the writers of the articles contained therein. The articles in question were written before the rupture of diplomatic relations between Italy and Austria; each article (of which there are 14) is preceded by a very brief biographical notice relating to its author. The names which stand above the articles are those of well-known authors or politicians, whom Italy is proud to own.

The first article of the series is from the pen of Diego Angeli, now employed on the staff of the *Giornale d'Italia*: the title of the original article is *La Francia in Guerra*. The author expresses the opinion that the present War will be known in history as the War without rhetoric. Never before have acts been so anonymous as the deeds of the present War, and a nation more impenetrable than are the French to-day. "All who think of France as a country overflowing with words, and excited beyond measure by the panoply of war, would," he says, "be stupefied and disconcerted at the serenity and silence that prevail there. The victory of the Marne although it delivered Paris from the nightmare of an invasion did not succeed in breaking the line of conduct deliberately chosen and pursued with so much tenacity." He continues: "The communiqués of Ministers, the orders of the Commander-in-Chief, the decrees of the Governor of Paris, are framed in a tenour of Spartan sobriety. 'The Generals seem,' it has been said, 'to be ignorant of the fact that the French language possesses adjectives.' But in this case it is a fortunate ignorance, as is fortunate also the ignorance which prevails concerning the names and the episodes of the battles. To-day, it is not a question of a hero here or there, for everyone is a hero; why attempt to exalt the name of one more than that of another, seeing that the one and the other are both doing their duty nobly?"

In an article republished in this number from the *Secolo* of 13th May, 1915, under the title *Tout ou Rien*, Cesare Battisti, member for Trent in the Austrian Parliament (now a refugee in Italy), sets out the aspirations of Italy. He points out that the people of Trieste wish for their complete liberty and to be freed from the yoke of the Hapsburgs; their desire, and that of the people of the part of the former Republic of Venice now under Austrian rule, is to be once more united to their motherland, Italy. Speaking for the people of the Trentino, he makes it clear that nothing less than the cession to Italy of the whole of that zone of the Tyrol which is inhabited by people of the Italian race will satisfy them; this represents the irreducible minimum. He calls attention to the fact that when the Government at Vienna, in order to destroy the unity of the *Italia Irredenta* Movement, proposed to found an Italian University at Trent or in some other small town, instead of at Trieste, Italians replied with one voice: "At Trieste, or not at all." He continues, "To-day, in the name of Trent, I renew this pact of concord with Trieste and cry: 'Though Trent may continue in the bonds of slavery, let not our mother Italy be guilty of any cowardly act!'"

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In another article from the *Secolo* of the 13th May, 1915, Leonida Bissolati, member for Rome in the Italian Parliament, deals with the question of the duty of Italy in connection with the War; this article is re-published, under the title *Les Devoirs du Moment*, in the number under review. He points out that the object of the negotiations which Austria had entered into with Italy was to obtain the neutrality of the latter country during the present War. He asks: "Would the adoption of such a course be in the permanent interests of Italy?" He points out that the Italian leaders are not so simple-minded as not to see through the Austro-German game. Once the Cabinets at Vienna and Berlin could succeed in laying Europe by the heels they would, aided by the neutrality of Italy, proceed with the carrying out of the annexation of Belgium and Serbia and with the doing of whatever else they have in mind, regardless of the protests of Italy. He urges that the Italian Government should break off the fruitless negotiations, in which it was at that time engaged, and should make it quite clear that Italy was not prepared to barter away her right and her duty to take part in the international politics of Europe.

An article by Guiseppe Borgese, Professor of German in the University of Rome, being one of a series by this gentleman published in the *Corriere della Sera*, appears under the title *Italie et Allemagne* in the number under review. The professor points out that, to-day, Italy is in one way or another, for better or for worse, up against the danger represented by the tyrannic arrogance of Germany. "The new possessions to which we aspire," he tells us, "will compel us, to-day, to remain armed, ready for defence and for the counter-attack. A proverb says, '*Qui terre a, guerre a*,' and this is still more true when the command of the sea is in question, and, for us, more especially the Adriatic." The article concludes: "But, at this hour, we must invoke Fortune that she may favour our cause. After that, we will take steps to exalt ourselves . . . and still with moderation."

Many of the other articles are of considerable interest. The volume concludes with the speech delivered by Salandra, the Italian Prime Minister, at the Capitol, on the 2nd June, 1915—Italy had declared war against Austria on the 23rd May, 1915—in which he reviewed the position of Italy and the difficulties she had experienced at the hands of her partners in the Triplice. He sums up the principles upon which Italy set so much store, and which she desired her partners in the Triplice to recognize, in the following terms:—

"(1). The defence of *Italianity*, which is our first and greatest duty.

"(2). A sound military frontier to replace that imposed upon us in 1866, a frontier which has opened wide to our adversaries the gates to Italy.

"(3). A strategic position in the Adriatic, less uncertain, less disadvantageous, than the one we have to-day and of which the evil consequences are so apparent."

He informed his audience that all Italian demands in respect of the above had been refused by Austria and Germany under various pretexts. He had, personally, great respect for Germany, but, in the name of his country, he would tell her: "We do not wish to be vassals; we do not wish to be the protégés of any Power in the world. The dream

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of universal hegemony has been shattered; the world is dead against it; the peace and the civilization of the future must be based upon respect for national autonomy, in which scheme Great Germany will take her place, equal to others, but superior to none."

These remarks were received with much enthusiasm and approbation by the audience.

The 75th number is entitled *Voix Américaines sur la Guerre de* 1914—1915; it contains 18 articles which have appeared in the American Press. The first article in the volume is taken from the *New York Tribune*, of 14th July, 1915, and is republished in this number under the title *L'Anniversaire de la Prise de la Bastille*. It is stated in this article that to many millions of men and women far from the battle front the National Fête of France would, in the year 1915, seem the most magnificent in the history of the country since that day on which the people of the Ancient Monarchy marched to the gates of the Bastille and made in the walls of tyranny a breach which has never been repaired. It is claimed that the Battle of the Marne will rank in history with that of Marathon; it saved the human race from the yoke of the *Superman*. If France had been defeated there, it does not necessarily follow that the Germanic ideal would have conquered the world for all time. "However it must be admitted," says the author of the *Tribune* article, "that had France perished, the work of long centuries would have been lost in the twinkling of an eye and the progress of humanity would have been retarded for many ages to come. The defeat of France would have converted the inhabited portions of the Old World, and of the New also, into huge barracks, and, for some time at least, civilization would have given to the soldier the foremost place in the scheme of life."

France by her victory has saved democracy, and on the first anniversary of the taking of the Bastille since the Battle of the Marne the whole world begins to appreciate the magnitude of the services rendered by France to the cause of civilization.

The second article in the volume appears under the title *Le "Cas" de L'Allemagne;* the original from which this is an extract is from the pen of Owen Wister and was published in the *Saturday Evening Post* (of Philadelphia) of 3rd July, 1915, under the title of *The Pentecost of Calamity*. "The condition of Germany," says Wister, "is a case for pathological examination and one specially for experts of mental disorders; it is a case of *Manie de la grandeur*, aggravated by *Manie de la persecution*." He concludes: "We know to-day that the German madness is akin to those mental epidemics of the Middle Ages, associated with religious fanaticism, which obscured the light of reason throughout entire States."

What is wrong with Germany is the *Prussianization of Germany*. Wister expresses the opinion that after our generation has passed away the origin of the present War will still be sought for, and in time the responsibility for the same will be traced to the proper quarters; the heaviest share of this responsibility, he thinks, will undoubtedly be placed on the House of the Hohenzollerns. In order to explain the *Prussianization of Germany* it is only necessary to go back to 1870. Bismarck's rapid and complete victory of that period over France blinded the German people, and they fell ready victims to the tyranny which was at

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once practised upon them in every domain of life by the governing classes. By way of compensation they tasted of the great joy of material prosperity on a very large scale. During 40 years, school children and 'Varsity students were brought up under the influence of the pestiferous odours given off by the dung heaps of Berlin. Misfortune overtook every professor or author who could not accept the doctrines propounded by Berlin for the purpose of imposing upon the credulity of the masses. From these dung heaps have sprung three phantoms, three Colossuses; the *Superman*, the *Super Race*, the *Super State;* these three unities compose the new trinity of German *Kultur*.

During these 40 years, the vision of Germany has, according to Wister, become obscured, she has lost all sense of proportion, she has become the victim of a series of delusions: her own greatness, her mission to propagate *Kultur*, her contempt for the rest of the world, her conviction that the rest of the world is jealous of her and is in league against her. Wister quotes the *dicta* of the Kaiser, his generals, professors, of Nietzsche himself, in order to emphasize what it is that the German creed, known as Prussianism, stands for. He asks: "Can the great country of Goethe unlearn its Prussian lesson and recover its health, in spite of the fact that it has for too long a time breathed poisonous fumes?"

Wister's own reply is as follows:—"One cannot say"; and continuing states that the Germans from behind the steel wall which now surrounds them shout that Great Britain provoked the present War, Louvain has not been destroyed, Rheims has not been bombarded, Germany is the victim of the jealousy of the world. When called upon by travellers for proofs in support of their asservations their only reply is: "Our officials tell us so." The German brain is still clothed in Prussian uniform and carries out a drill after the Prussian style. "Will adversity," asks Wister, "break this cursed spell, will it dispel these deadly delusions?"

Many of the other articles are written in the same strain as those from which the above extracts are taken. Four of the articles in the volume deal with the torpedoing of the *Lusitania;* one of these—from the pen of Morris Jastrow—appeared first in the *Public Ledger* (of Philadelphia) for 5th July, 1915, and is republished in this number under the title *Le Cas du "Lusitania" d'après un Germano-Américan.* In this article it is pointed out that the entire German nation has raised a protest, couched in language of pathetic indignation, against the bitter and cruel charge (*sic*) put in circulation against them in the United States of America. Mr. Jastrow states, in his article, that the time has come for the true friends of Germany to tell her, without any beating about the bush, that the torpedoing of the *Lusitania* is an act which cannot but cause her friends to accept as correct the reports in circulation concerning her. He points out that modern war with its wide application of the latest conquests in the fields of science intensifies greatly the conflict between the claims of civilization and the mode of prosecution of war. The only safeguard to civilization is a humanitarian spirit; such a spirit should be preserved as the most precious possession of the human species, being the fruits of a long and painful contest during many centuries.

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In the other articles on the same subject, it is made clear that the *Lusitania* crime has caused Germany to be looked upon as an outlaw among the nations of the world and has engendered such a feeling of revulsion in the minds of American people against the Teutonic Powers as to create a positive longing for the decisive defeat of the Central Powers.

An article from the pen of Dr. Morton Prince, which appeared in the *Boston Herald* of 3rd April, 1915, is reproduced in this number under the title *La Conscience Américaine est elle Morte?* In this article Dr. Prince sets out a great number of infractions of International Law committed by Germany. He points out that the question under consideration is not that of neutrality, but that of American ideals regarding a national conscience. He feels that a vast majority of Americans agree that the United States, in not entering a protest against the German invasion of Belgium, has lost a valuable opportunity of disclosing herself to the world as a great moral force. He reviews the German mentality at considerable length and expresses the opinion that Germanism and Pan-Germanism are amongst the most important questions which have had to be taken into consideration by the United States of America, indeed by the whole world, since the date that the question of slavery was disposed of.

"Between the ideal of German autocracy and that of American democracy," says Dr. Prince, "there is an irreconcilable and inevitable conflict." A war on ethics already exists between the American people and Germany; it is not directed by the former against German democracy, but against the German autocracy. When the ideals of the American conscience are challenged, the United States, says Dr. Prince, remains silent. "Had a Sumner or a Phillips, a Garrison or a Lowell, an Austen or a Lincoln been living to-day, would we," he asks, "have maintained a like silence?" And this is his main reason for raising the question: "Is the American conscience dead?"

The last article in the volume is a letter from Dr. J. Marx Baldwin, of New York, sent in February, 1915, to Dr. Hugo Kirbach in response to the invitation issued by the League of German Universities to neutrals, who have been educated in Germany, calling upon them to assist in dispelling the unfavourable opinions formed concerning German aspirations. Dr. Baldwin's letter deals with the subject under four heads:—

1. In that which concerns the truth.
2. Another truth.
3. Yet another truth.
4. As to the aspirations of Germany.

A very close examination is made in this letter of German acts, methods of conducting war, culture, etc., and its contents can hardly have proved palatable to the well-wishers of the League of German Universities, for Dr. Baldwin puts his finger on all the weak points of Germany's case.

The 76th number is entitled *Voix Espagnols*, and contains the views of a number of well-known Spaniards; and in it are also reproduced articles which have already appeared in the Spanish Press. In a preface to this volume, Gomez Carrillo discusses the question of German in-

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fluence and French influence. Carrillo points out that the nature of the moral and intellectual intimacy between peoples is not a matter upon which opinions can be formed merely from abstract study; much injustice has been done by writers who have given to the world their impressions of other nations based on such study alone and without any contact with the inner life of the nations discussed. The works of France and Germany in the fields of literature, of the sciences and of colonization, are analyzed, and the debt that the world owes to them for the part each has separately played in the progress of civilization is examined

Carrillo sums up the situation and states that Spain, by reason of racial affinity, of its traditions, of its religion, will always be in greater sympathy with France than with Germany, in the moral as well as in the intellectual domain; of the two, he considers France has been a greater benefactress to the human race than has Germany.

The first article in this volume is from the pen of the Marquis del Muni, who was for many years Spanish Ambassador at Paris. He states that the opinions of the Spanish people, as of others, are divided in relation to the present War; this must inevitably be so as the conceptions of the several partners of the two belligerent groups in relation to political, sociological and doctrinal matters differ widely. Broadly speaking the Central Empires stand for social discipline of an autocratic kind, blind submission of the citizen to the orders of the public authorities; whilst the Entente Powers represent the progress of democracy, the supremacy of the civil power and the development of constitutional liberties. This accounts for the present war being a conflict between two kinds of mind, between two opposite kinds of intellectual culture, between two different conceptions of civilization. Thus it is that in Spain the sympathies of the extreme Right lean towards the doctrines and ideas of the Austro-German alliance, whilst the sympathies of the liberal groups and the extreme Left are strongly with the Entente Powers.

Père Corominas, member of the Cortes, contributes an article full of emotion entitled *Pour l'Amour de la France.*

In an article entitled *Le Monde Espagnol et la France* V. Blasco Ibanez points out that the Pan-Germanists, who have in recent years been exploiting everything with a view to the glorification of Germany's military vanity, have not hesitated to mobilize science to attain their ends, to transform the universities into barracks, and to turn even the professors into corporals, to drill the public mind and to mould it according to the pattern of the German verities. The poetic and sentimental Germany of Madame de Staël, the virtuous and thoughtful Germany of Michelet have long ceased to exist; to-day we have a Germany consisting merely of men of action, vain of their rapid success, surfeited with pleasure and riches, a Germany persuaded that material prosperity is the sole aim and object of human progress, a Germany desirous of imposing her own polity and mentality on the rest of the world.

However, the *homo mediterraneus*, who has his special conception of human dignity, is not willing to accept the automatic discipline advocated by Prussia and to admit it to be the best model of existence. His sense of ridicule renders it impossible for him to proceed along the way of life marking time and stepping out with stiffened limbs as in the goose-step invented by the Sergeant-King of Prussia.

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The *homo mediterraneus* has formed three great groups which stand for the Latin tradition; the Italians, the French and the Iberians. Italy is the country of the Renaissance; France gave to the world her Revolution, the most important event in the history of humanity since the advent of Christianity; the Iberian Peninsula gave the world to the world; thanks to her, humanity has taken complete possession of our planet, and our globe has in consequence ceased to be a mysterious palace, in which man occupies only a few rooms on the ground floor.

It is pointed out in this article that French and British capital have done more for the economic life of Spain than the efforts of any other country. So far as Germany is concerned, she imports nothing from Spain, but exports to the latter country what she can and as much as she can. Germany seems since the beginning of the War, however, to have suddenly acquired a great affection for Spain, a country until recently quite ignored by her. German agents are noted for their want of tact and Spaniards have not found it difficult to see through Germany's game. These agents have invited Spain to profit by the present struggle and, in defiance of her sacred engagements, to seize Tangiers. On another occasion, hoping to impose on the credulity of the Spaniards, German agents promised them that if they would take sides with Germany, the Kaiser would give them Gibraltar. Ibanez remarks that history affords no record of any occasion on which the Prussian Monarchy, having once got something into its claws, has ever been known to part with it again. The Germanic double-headed eagle has been, it is said, a bird of bad augury for Spain; the latter's decadence dates from the time that a German strain was introduced into blood of Spanish rulers.

"All thoughts," says Ibanez, "are turned to the future. What is to be the outcome of the present War? A German triumph will mean the deification of *Force*, as the source of all right; the consecration of war, as the state of perfection for man to aim at; the cult of extermination, as a special gift from the Almighty; the banishment of the true spirit of Christianity, as an obstacle to the reinstitution of the barbarous religion of Odin."

"This shall not be," says Ibanez, "let France triumph! For France it is that represents the right of the weak as well as the strong to live; she is the fountain of justice in this world; she is the champion of spiritual progress. These are the things which make for liberty, a state of existence which has not crossed over to the far side of the Rhine."

This volume contains, among other things, the manifestoes issued by Spanish intellectuals and also those issued by Catalan intellectuals, and concludes with a brief reference to the attitude of the Spanish Press in relation to the War.

The 77th and 81st numbers contain the text of the official communiqués addressed by the Central Government to the Provincial Civil Authorities in France and are the XIV. and XV. Volumes of the series dealing with such matters. The 77th number covers the period 1st—31st August, 1915, and the 81st number the period 1st—30th September, 1915; each number contains appendices giving details of the principal events which have taken place during the same month as the communiqués contained therein.

The 78th number is entitled *L'Anniversaire de la Déclaration de Guerre*

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(4 *Aôut*, 1914—4 *Aôut*, 1915). In a preface to this volume Monsieur Henri Welschinger deals with the proceedings in the Senate and the Chamber of Deputies on the anniversary of the Declaration of War, and with other matters connected with this anniversary. He points out that Germany was blind to the essential qualities and living force possessed at all times by the French nation: its firmness, decision of character, courage, sang-froid, obstinacy, its passion of devotedness and self-sacrifice. "War," it has been said, "makes more men than it kills." Paradoxical as this may appear, it is nevertheless true. Such has been the experience in France during the present times of stress.

Monsieur Welschinger calls attention to a statement recently made by Mr. Wayne MacVaugh, the new United States Ambassador to the Court of Rome, in which occurs the following passage:—"In the whole course of history, I have seen nothing more sublime than the devotion and the spirit of liberty with which the sons of France have defended their country and the whole world against the invading tide of Attila's race and of the Huns; the measures to instil fear taken by the enemy have caused them no alarm. Savagery, the employment of poison, petrol, vitriol, new engines of war and new explosives have in no way terrified them. In the presence of uncertainty and during a prolonged and ferocious struggle their splendid courage has at no time deserted them."

It is also pointed out in this preface that the Presidents of the Senate and of the Chamber of Deputies both urged in their addresses to their respective Houses, on the occasion of the War Anniversary Meeting, that increasing attention should be paid to matters of organization, and that everything possible should be done to develop to its maximum the output of munitions and other necessaries connected with the *industry of war*.

In a concluding paragraph Monsieur Welschinger exhorts France to follow her ancient and noble traditions, to fight without a respite for the complete restitution of those portions of French territory now in enemy hands and to strive for the maintenance of that independence which has always been so dear to all Frenchmen.

The text of the addresses of the Presidents of the Senate and of the Chamber of Deputies, as well as the message of the President of the French Republic, on the occasion of the first anniversary of the Declaration of the War, are published in the volume under review. The historical meeting of the Duma on the 1st August, 1915, is dealt with under the title *En Russie*. The speeches made at the meeting of the Duma by the more prominent speakers are reproduced, among others being that of Sazonof, the Foreign Minister, who, on this occasion, reviewed the political situation and referred to the pledges which exist for the success of the Entente Powers. Under the title *En Angleterre* will be found the text of the telegram addressed by King George V. to the President of the French Republic on the 4th August, 1915, and the latter's reply thereto, as also the speeches made by prominent British politicians on this occasion.

Further, the Kaiser William II. is not overlooked. In an appendix there will be found, under the heading *A Berlin*, the text of the sermon he delivered to his faithful subjects on this anniversary. This appendix

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concludes with two repartees to the Kaiser's speech ; one from *L'Homme enchaîné* on 3rd August, 1915, and the other from *Le Figaro*, 2nd August, 1915.

The 79th and 80th numbers of the series are both entitled *Paroles Françaises*. In a preface to the 79th number the editors point out that one of the objects they had in mind in bringing out the *Pages d'Histoire* series was to preserve, suitably classified, the speeches and articles which had moved the people of France at a time when the War stirred up their patriotism to its uttermost depths. The numbers of the series already published, *i.e.*, the 4th and 23rd numbers, which deal with proceedings of the French Legislature and the *Institut de France*, partly fulfil the object in view (*vide R.E. Journal* for February and June, 1915).

The editors, in the numbers now under review, have yet another object in view. In the 40th number of this series (*vide R.E. Journal* for July, 1915) will be found, under the title *Paroles Allemandes*, extracts from speeches and the writings of leaders of thought in Germany ; something is wanted to counterbalance this German exuberance. Hence, we have the volumes entitled *Paroles Françaises*, the contents of which are the very antithesis to the extracts appearing in the volume entitled *Paroles Allemandes* and provide the necessary corrective. It is pointed out in the preface to this number that in contrast with the cynicism and low cupidity, the pride and cruelty displaying itself impudently in the writings of the Bernhardis, the Treitschkes, the Von Hartmanns, the Von der Goltzes, of the Hardens, we have in the volumes now under review the polish of the ancient virtues of France provided in the magnificent flights of imagination of a de Mun, in the flow of spirit of a Clemenceau, in the delicate sentiments of a Barrès. In contrast with the hypocritical homilies of the Bishops of Cologne and the Court preachers of Prussia, we have the impressive lessons regarding morality, faith and courage of the chaplains, pastors, priests and rabbi, who are a source of honour to the pulpit and the sacerdotal office in France. But the most striking difference of all is that which distinguishes the representatives of German *Kultur* from the champions of French civilization.

In the 79th number are contained extracts from the sayings and writings of French statesmen, Members of Parliament, diplomats and publicists, whilst in the 80th number appear the addresses and writings of members of learned societies, of the universities, the Ministry of Education, as also those of leading soldiers and the President of the Republic. To do justice to the contents of these two volumes a separate review would have to be prepared ; unfortunately considerations of time and space forbid the adoption of this course. Brief reference to a few only of the articles is alone possible.

The 79th number contains 20 articles of which the first, entitled *La France debout!* and dated Paris, 2nd August, 1914, is from the pen of the late Count Albert de Mun. In the opening sentence, the Count points out that the time for long articles dealing with the situation had passed ; the time for action had already arrived. He continues : " Today, if I understand rightly the echo of the souls of the sons of France, two sentiments are uppermost in men's minds, indignation and pride. Indignation against brutal and deceitful Germany, who is about to push Europe heedlessly into the most dreadful of catastrophes ; pride in our

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beloved France, who, bravely, calmly, without brag and without weakness, accepts the Teuton's challenge and is about to pick up the glove thrown in her face."

He proceeds to deal briefly with the situation and the failure of the Powers to persuade Germany to accept the proposals for a conference to be held with a view to the amicable adjustment of matters in dispute between Austria and Serbia. The Count points out that it would be useless for Germany now, by any manœuvre similar to that of the falsification of the Ems despatch, successfully to denounce France as the aggressor. The situation was too well understood throughout the civilized world for such an attempt to succeed. "Germany," he says, "is now of her free will wafted by her Destiny along the path she has chosen: she discloses, by the way, the secret designs which, for so many a long year, have been ever uppermost in the minds of her military chiefs and of the professors of Pan-Germanism. The question now before all Europe is whether the nations will bow down in submission to German hegemony. It is for the nations to give their answer."

Speaking of France, the Count continues: "Sure of her good right, she rises in her might, and free at last, by reason of this uncalled-for provocation, she who has for so long a time restrained her most just resentment, her unconquerable hopes, now holds out her hand to those brothers of Alsace and of Lorraine, who, for forty years, have cherished so dearly the memory of their motherland."

In an article entitled *À la Veille de la Action*, also dated 2nd August, 1914, Monsieur Clemenceau deals with the situation which was to plunge Europe into the most terrible war of all time. He points out that on five separate occasions since the date German soldiers were last in Paris, the peace of Europe has hung in the balance; on each of these occasions, without the slightest provocation, Germany placed her hand on the hilt of her sword preparatory to drawing the blade out of its scabbard.

France, by the exercise of considerable self-control, has on these occasions averted the catastrophe of a war.

He continues: "Yonder, on the far bank of the Rhine, dwells a nation, which has a right to live, but which has not the right to destroy all other life independent of herself in Europe; this nation is so obsessed with the idea of her own importance as to be no longer able to control herself if France dares to look up when she speaks."

Clemenceau points out that the Kaiser is infatuated with the mad idea of German designs to make an end of France, Great Britain and Russia, a task quite beyond his capabilities. "Germany," he says, "must succumb to the same inflexible law which laid Napoleon low, when he attempted to rise to still greater and greater heights."

Later in the article he continues: "Is the contest equal? Serbia did not ask for war when she bravely demanded the ultimate right to the dignity of her separate existence. We have, in regard to the negotiations, greater liberty of action. Moreover, we have at our command forces and other resources with which, it would seem, the infatuation of our adversary has not sufficiently reckoned. In spite of our past negligence in this respect, in which matter Great Britain and Russia have not been much less guilty than ourselves, we shall be able to bring on to the battlefield a sufficiently satisfactory force."

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This article concludes with a brief reference to the assassination of Jaurés, one of whose last acts was to descend from his pinnacle of idealism in order to rally his friends in the cause of France.

In an article entitled *La Belgique en France* dated 16th October, 1914, Monsieur Hanotaux touches upon the unhappy condition in which Belgium found herself in the late autumn of 1914. He calls attention to the noble and touching proclamation of King Albert's Government to the Belgian people; a people at that time seeking the hospitality of another on whose behalf they had sacrificed themselves. He says: "Modern Belgium is the daughter of France and Great Britain; it is natural then that in the day of her dire distress she should seek asylum in the homes of her two mothers." France extended a hearty welcome to the exiles; she knew what was owing to King Albert and his people. There exists a relationship of old date between the peoples of France and of Belgium. The first kings of France came from Belgium; Clovis, the founder of France, belonged to Tongres and Tournay, and the second dynasty of France had the blood of the Pépins of Landen and Héristal in their veins. Hanotaux continues: "History teaches that all Europe is the debtor of the Low Countries. In the XVI. century, your forbears have known the meaning of the terms devastation, torture, burnt and pillaged villages, all those acts of violence by which pride of domination attempt even at the present time to tame the souls of the Belgian people of to-day. But their courage made them superior to all privations and maltreatment and the liberty of Europe dates from those times."

. . . .

"The Germans announce that Antwerp is become their base of operations against England. So much the better! England well knows what her duty is in this matter; menaced by the pistol aimed at her heart, she will not lay down her arms until Belgium is completely delivered from the invader and is strong enough to form a rampart against German ambitions."

"As for France, she is doing her duty; she it is who is holding in check the terrible machine of death launched against the world. . . . No sufferings dishearten her soldiers, no fatigues wear them out; theirs is the confidence which will win victory."

Amongst other articles in this number is one entitled *La Guerre et la Vie de Demain* by Leon Bourgeois, in which he points out that the present war shows that the French soldier has not lost any of the qualities for which he has been famous in the past; the men of 1914 are the true descendants of those of 1792 and 1814; and after the War the men of 1914 will be as worthy of admiration as they have been at any time since the 4th August, 1914.

In this number are also included speeches by Messieurs René Viviani (delivered on 14th April, 1915, at a fête given in Paris to wounded soldiers and sailors), Paul Deschanel (delivered on 2nd May, 1915, at a second fête given in Paris to wounded soldiers and sailors) and Ribot (delivered on 25th June, 1915, at a meeting of the Chamber of Deputies).

The final article in this number is entitled *Paroles Russes et Allemandes;* it is dated 3rd August, 1915. It is pointed out in this article

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that a comparison of the manner in which Russia and Germany commemorated the first anniversary of the declaration of War contains much to give comfort to the Entente Powers. No discouraging symptoms were discernible in Russia owing to the strategic retreat of the Grand Duke Nicholas. On the other hand, in the proclamation addressed on this occasion by the Kaiser to his faithful subjects, it was noticeable that its tone was not so emphatic or so confident as that used by him only a month previously; he made no allusion to the irresistible forward movement with which he proposed to crush France and Russia successively.

The 80th number contains 30 articles. The first article in this number is entitled *Acte de foi;* it was written by Monsieur H. Lavedan on the 25th August, 1914. The article opens with the statement: "Our general offensive has not enabled us to break through the German lines."

"We have been obliged to retire and it will be necessary for us to await a better chance." Lavedan then proceeds to recite his articles of faith as follows:—

"I believe in the courage of our soldiers, in the science and devotion of our chiefs.

"I believe in the power of right, in the crusade of civilized peoples, in France, eternal, imperishable and irreplaceable.

"I believe in the price of grief and in the efficacy of hope.

"I believe in confidence, in devotion, in daily labour well done, in good order, in militant charity.

"I believe in the blood flowing from wounds, and in the holy water in the stoup, in artillery fire and in the light of the spluttering candle, in the rosary.

"I believe in the sacred vows of the aged and in the depths of ignorance of the young.

"I believe in the prayer of women, in the heroic vigil of the wife, in the pious resignation of mothers, in the justice of our cause, in the unspotted glory of our flag.

"I believe in our historic past, in our magnificent present, in our glorious future.

"I believe in my countrymen of to-day and I believe in our dead.

"I believe in the mailed fist and I believe in the hands clasped in prayer.

"I believe in ourselves, I believe in God. I believe, I believe."

There is reproduced in this number the address given by Monsieur Henri Bergson on the 12th December, 1914, at the annual public meeting of the Académie des Science Morales et Politiques. As might be expected Bergson dealt largely in his address with questions relating to Germany. He drew attention to the universal execration called down on Germany by the crimes she has so methodically committed. "Civilization on previous occasions has," he tells us, "unfortunately experienced a return to the forms of barbarism now exhibited by Germany; but this is the first occasion on which there has been such a strong combination of Powers for the purpose of combating this evil."

In dealing with the growth of Prussia, Bergson points out that it is largely by shady methods that provinces have been acquired or conquered by her. Her methods of administration are mechanical. Mech-

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anical is also the army on which the Hohenzollerns have concentrated so much attention.

Germany has been spoilt by her rapid success during the past half-century. Her latter-day philosophy has caused an aberration of mind in her people; and they have become imbued with an insatiable and perverse ambition. If the Teutonic race are the chosen people "then," says Bergson, "they are the only people who have an absolute right to live; others they may tolerate." It is this tolerance which would be known as a state of peace if Germany could win. Dealing with Germany's method of conducting war, he proceeds to explain her policy in the following terms:—"But on the day when Prussian militarism —now become German militarism—joined hands with industrialism, it was the enemy's industry and commerce, it was the sources of the enemy's riches, it was the enemy's riches itself against which war had henceforth to be directed, at the same time, as against the enemy's military power. It became necessary to destroy the enemy's factories, in order to remove the possibility of competition; it also became necessary definitely to impoverish the enemy and to enrich one's self, to make the enemy's towns pay ransom, to pillage and to burn. Above all things, the War had to be short, not only in order that the economic life of Germany might not be put to too great inconvenience, but for the further reason, and, above all, because her military power did not find, within the scope and provisions of a law superior to that of force, the means required to maintain and recuperate itself."

Such is the explanation of the acts of Germany of which so much have been heard these last two years. "Scientific barbarism," "systematic barbarism," some have called these acts.

In conclusion Bergson predicts that when peace reigns once more, France will continue to march forward, always in the same direction and always towards higher planes, always towards just and true ends, always protecting the interests of humanity as well as her own.

In an article entitled *La Guerre et la Vie de Demain*, dated 16th—23rd January, 1915, Monsieur Emile Boutroix sets out the lessons of the War; very briefly they are as follows:—

1. No nation can afford to go to sleep; satisfied, by reason of pure laziness, that it is secure against attacks.

2. The defence of a country can no longer be looked upon as some special requirement, devolving solely on a particular class in a nation.

3. It is impossible for any Power whatsoever, be it big or small, to become absorbed in local politics and its own internal life and to relegate to a secondary position questions affecting its foreign policy.

Whether we like it or no war is still something that every nation must reckon with if it desires to continue its existence as a separate entity, formulating its own polity, retaining its old privileges, possessing weight in the councils of the nations of the world.

Monsieur Boutroix next points out that Germany has, in recent years, strayed far from the ideals held by her in the days of Goethe and examines the intellectual evolution which has been taking place in recent times in that country. The consequences of this evolution are that Germany has attempted to show the world as well as herself that, owing as much to her science as to her power, she has been called

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to inherit, upon this earth, the Kingdom of God. During the apotheosis of Germanism, which France has seen with stupor to be taking the place of the doctrines inculcated by Leibnitz and Goethe, she has jealously retained her classic ideals of long ago.

In a short and interesting article entitled *La Guerre française* (dated 29th July, 1915) Monsieur Gabriel Séailles contrasts the French and German methods of making war.

Among the other articles contained in this number is the order of General Joffre, dated 10th September, 1914, eulogizing the VII. French Army for their glorious conduct during the fighting in the early days of the War.

A short letter of thanks from General de Maud'huy to the men and women employed at Creusot's work is also published in this number, which concludes with the address delivered by the President of the French Republic on the 14th July, 1915, on the occasion of the transfer of the remains of Rouget de Lisle to the Invalides. In this address the President recalled the circumstances under which de Lisle composed the French National Anthem, a hymn which gives vent to the cry of vengeance and of indignation contained in its stirring verses. Many a deed of valour, he tells us, has been done during the present War to the accompaniment of its soul-lifting strains. In conclusion he added: "Let us, gentlemen, let us finish our holy work; the French levies are opening up the road to victory and to justice!"

The 82nd number is entitled *Mines et tranchées*. It contains a brief history of the origin and development of trench and mine warfare. Many personal incidents in connection with the trench fighting, and mining and countermining operations, during the present War, are recorded in the pages of this number. Incidentally it may be mentioned that the trench warfare of 1914 was predicted in 1902.

The 83rd number is entitled *Nos Marins et la Guerre* and contains, in diary form, all the more important incidents of the War at sea during the period 3rd April—14th August, 1915. In an appendix are reprinted statutes and regulations dealing with the recently-instituted *Croix de Guerre*, and also short articles on naval subjects.

The 84th number is entitled *Les Alsatiens-Lorraines en France pendant la Guerre* and contains a number of newspaper articles dealing particularly with the situation in Alsace and Lorraine.

The 85th number is entitled *La Diplomatie française* (sub-title *L'Œuvre de M. Delcassé*). This volume, which is accompanied by a portrait of Monsieur Delcassé, is an appreciative biographical sketch of that statesman's career; a statesman to whom France owes much. To his perspicacity, to his tenacity of purpose, to his application to the duties of the high offices he held, to his readiness to sacrifice his own career in the interests of his country, to his self-command is it due that France found her preparations for self-defence as far advanced as they were when the Teuton hosts overran her northern borders in the autumn of 1914.

W. A. J. O'MEARA.

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NOTICE OF MAGAZINE.

REVUE MILITAIRE SUISSE.

No. 11.—*November*, 1916.

MESOPOTAMIA AND THE DARDANELLES.

The *Revue* article opens with the statement: " If the German defeat on the Marne is attributable mainly to German vanity, it is correct to say that British vanity is responsible for the two serious checks to the cause of the Western Allies met with at Gallipoli and Kut-el-Amara."

The author of the *Revue* article calls attention to the fact that William II. spoke at the beginning of the War of crushing " French's contemptible army," ; nevertheless, it was this army which helped to save the situation on the Marne. On the other hand, the British have always affected a profound contempt for the Turkish Army, but it was this army which inflicted crushing blows on British troops at the Dardanelles and on the banks of the Tigris.

In both the situations last recited failure is clearly traceable to want of preparation owing to ignorance concerning the resources of the enemy. The bitter lessons of the Boer War, says the author of the *Revue* article, have taught British statesmen nothing, they are as much wanting now in perspicacity in relation to the conduct of a war as then. The British Army fighting, at the present time, in France has, as far as can be judged, been organized, it is said, with forethought and trained by men having knowledge of the conditions of a modern war. The Dardanelles and Mesopotamian Expeditions, on the other hand, were entered into with a light heart by dilletanti without any military experience. Magnificent troops have been carelessly sacrificed, and the result has been a retreat without glory in one case, and a shameful capitulation in the other.

The responsibility for these checks, says the author of the *Revue* article, does not fall on the British troops or their immediate chiefs, whose conduct could not have been surpassed, but on the British people who, for centuries now, have failed to pay attention to military matters, and on the British Government, which is quite ignorant of all that concerns war.

Turning to the Expedition in Mesopotamia, of which region a sketch-map is included in the text, the author of the *Revue* article says that it seems doubtful whether it was originally intended that the British Expeditionary Force should march on Bagdad. He calls attention to an article published in the *Journal of the United Service Institution of India* for October, 1915, in which it is indicated that the British Expeditionary Force was got ready in anticipation of a rupture with Turkey, in order primarily to protect the British residents at Basra and the petrol refinery at Abbadan (in Persia), near the mouth of the Shatt-el-Arab.

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It is pointed out that as soon as war was declared on the 31st October, 1914, one Indian Brigade, at that time held in readiness for the purpose in the Gulf of Persia, was at once transported to the mouth of the Shatt-el-Arab. At this time the Turks had three Divisions in Northern Mesopotamia and one Division, reinforced by gendarmes and auxiliaries, in Southern Mesopotamia. A British force consisting of 3,200 rifles and 2 mountain batteries was sent against a Turkish force consisting of 8,000 rifles and 32 guns. The author of the *Revue* article remarks that it is a question whether one ought to admire most the boldness of the soldiers who dared to undertake the conquest of Mesopotamia with so small a force, or whether one ought to marvel most at the lack of foresight and at the ineptitude of those who sent them there.

At first things went well with the British force, which effected a successful landing on the 6th November, 1914, at the mouth of the Shatt-el-Arab and proceeded up the river as far as Abbadan, which was reached on the 8th *idem*. Abbadan being in Persia, the British force was landed at and occupied Sainyeh, opposite to it on the right bank. About this time the main body of a Turkish Division occupied a position between Sahil and Balaniyeh. On the 14th *idem* the British received as reinforcements another Indian Infantry Brigade, 3 batteries of artillery, 2 squadrons of cavalry, and 2 companies of Sappers & Miners.

Heavy fighting took place on the 17th *idem* which resulted in the Turks abandoning Sahil and retiring on Balaniyeh. The Turks left 2,000 dead on the field and lost 50 prisoners and also 2 mountain guns. Three days later the British advanced to attack Balaniyeh, but the Turks, refusing an action, retired from their position. On the 22nd *idem* the British column reached Basra without having been again engaged and on the following day hoisted the Union Jack there.

The first objective of the Expeditionary Force was, therefore, reached in less than three weeks. It would have been wise, says the author of the *Revue* article, for the British to have been content to consolidate themselves at Basra, some 62 miles from the sea, before advancing further. Although the Arabs in this region are not friendly to the Turks, they bear the British little love. Everything indicated the necessity for prudence. However, the British thought otherwise and pushed on, reaching Kurna at the beginning of December. Some Turkish troops were dispersed at the latter place, and a Turkish divisional commander surrendered himself with 42 other officers and 1,000 men.

A concentration of Turkish forces was reported a few weeks later, at Rotah, to the north of Kurna. A British column was, in consequence, sent forward to reconnoitre towards Rotah, at the same time the Turks at that place fell back; insufficient information concerning the enemy was obtained, neither the numbers of the Turkish force nor the positions occupied were ascertained. Mirage always renders reconnaissance work difficult in country of the nature in which the operations in question were in progress; aeroplanes would have proved a valuable adjunct, but none accompanied the British reconnoitring force.

By degress the Turks began to display greater activity and showed an intention of reoccupying Basra. Probably in order to entice the British to divide their forces the Turks commenced to threaten Ahwaz

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in the Karun Valley; this territory was at that time in the possession of the Sheik of Mohammera, a British Ally. A British detachment sent towards Ahwaz did not achieve any decisive results.

On the 11th April, 1915, a considerable Turkish force attacked Basra; fortunately a British Brigade had just arrived in Mesopotamia from Egypt. At this time the British force in Mesopotamia consisted of five Infantry Brigades; probably halt this force was in the immediate vicinity of Basra. The Turks were, it is thought, in slightly superior force. The battle lasted until the evening of the 14th April; the Turks were beaten and retreated at nightfall and did not halt again until they had reached Khamasie, situated nearly 100 miles further inland on the right bank of the Euphrates.

The author of the *Revue* article gives extracts from the article in the *Journal of the United Service Institution of India* referred to earlier; by way of introduction he remarks that this semi-victory was more creditable to the British troops engaged than to their Higher Command. In this battle the victors wheeled right round and at the end of the fight were back at their old camp grounds, whilst although the vanquished retreated in wild confusion, yet they managed to save all their guns.

Once Basra was out of danger, General Gorringe's Division was sent into the Karun Valley and hunted down the Turks, without however being able to bring them to action. The main body of this Division returned to Basra towards the middle of June, 1915. One Brigade was moved from Ahwaz on Amara, as a concentration of Turks was reported to be in progress at the latter place. About the same time General Townshend's Division was also directed on Amara along the Tigris. The British now for the first time made use of aeroplanes and learnt from their aviators on the morning of 1st June, 1915, that the Turks were retreating. Townshend rapidly pushed forwards some troops in a steamer and arrived at Amara on the morning of the 3rd June, 1915; with the assistance of only 22 men, General Townshend made 700 Turkish regulars prisoners. The main body of Townshend's Division arrived at Amara on the following day and a fortnight later a Brigade from Ahwaz also reached Amara.

At the end of June, Gorringe, on his return from the Karun Valley Expedition, advanced on Nasiriyeh, at the junction of the Shatt-el-Hai and Euphrates Rivers. He occupied this place on the 25th July, 1915, after three weeks' stubborn fighting and thus completed the conquest of Southern Mesopotamia.

The author of the *Revue* article remarks that these operations were clearly necessary for the protection of Basra; they were conducted without haste, but with method. It would have been preferable for the British to have remained content with the progress thus made and not to have attempted to have pushed further into the interior; Amara and Nasiriyeh are both of them nearly 200 miles from the sea, and not even the half-way houses to Bagdad.

The British, however, allowed themselves to be deceived by their easy success, as did the Germans in the early days of the autumn campaign in 1914; probably the British Intelligence Service was also at fault. Only a few weeks after the capture of Nasiriyeh a new British

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column was pushed forward towards Kut-el-Amara, nearly another 100 miles further inland.

The author of the *Revue* article calls attention to Colonel Yates' account of this expedition published in the *United Service Magazine* for June, 1916.

Townshend's advance to Ctesiphon is briefly described, a reference being made to the successful British attack on the Turkish lines on the 22nd November, 1915, and the vigorous counter-attack which followed and cost the British force so dearly, necessitating as it did the retirement of the British. Townshend was back at Kut-el-Amara on the 7th December, 1915, where the Turks quickly invested him.

The Bagdad Expedition, says the author of the *Revue* article, was undertaken with an insufficient force and failed pitiably in spite of the bravery of the troops and of the dogged energy shown by them. The relieving column, under General Aylmer, organized in great haste, had little chance of success from the first. After undergoing various vicissitudes it was brought to a halt before the Turkish positions at Es-Sinn and Sannaiyat.

A second relieving column which attempted to advance along the Euphrates met with as little success.

After making due allowance for the natural difficulties of the situation, the criticism is made that, with more foresight, it ought to have been possible, in the five months during which Townshend held out, to have relieved the force at Kut-el-Amara or at least to have revictualled the besieged garrison. But famine reduced the garrison and caused its surrender. Thus ended, after 18 months of heroic combats, an enterprise which was ill-conceived, and as badly directed, by politicians and amateur strategists. The Government of India, says the author of the *Revue* article, made impossible demands on the troops ; it has reaped the harvest that it has sown. It would have been a joyful thing for the British to have entered the city of the Caliphs and to have hoisted the Union Jack to the strains of *God Save the King*, but to make this a possibility a desperate resistance on the part of the Turks to such a proceeding should have been anticipated and met by a proper organization.—(*To be continued*).

IMPRESSIONS FROM THE AUSTRO-HUNGARIAN FRONT.

IV.

On the Isonzo.

The first part of the article under the above main title was reviewed in the *R.E. Journal* for November, 1916 ; two other parts have appeared in subsequent numbers of the *Journal*.

The Carso.—A short description of the topography of the Carso is given, a sketch-map of the region being included in the text. The average altitude of this plateau above sea level is about 650 ft. ; the summits of some of the hills, however, attain an altitude of 1,620 ft. above sea level. As compared with the temperature of Trieste that of this region is much colder.

The northern boundary of the Carso is the Vippaco Valley, the southern

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the sea, the western the river Isonzo. On the east the plateau joins up with the lower slopes of the Carniolan and the Croatian Alps. There are only a few first-class roads across this plateau. On its western boundary, a distance of from 7 to 8 miles only separates the Vippaco Valley from the sea. The distance from Trieste to Duino is only some 13 miles. It was at the latter place that the Austrian left flank rested when the *Revue* article was written. As this region is absolutely waterless, extensive works had to be executed for the storage of water and for its distribution at a distance of from 35 to 50 miles from the catchment area. From the Doberdo Plateau, having an average altitude of 325 ft. above sea level, rise Mont San Michele (culminating point about 900 ft. above sea level) and Monte dei Sei Busi (390 ft. above sea level); the western slopes of the Doberdo Plateau skirt the Isonzo River. After 14 months of heavy fighting the Italians finally wrested the Doberdo Plateau from their adversaries. Mont San Michele and the Monte dei Sei Busi played a prominent *rôle* in the first five battles of the Isonzo.

The Battles of the Isonzo in 1915.

The line of the Isonzo, extending from Monte Nero (altitude about 7,300 ft. above sea level) to the sea measures approximately 50 miles. The upper part of the valley is practically a mountain region; from Goritz to the sea, the river flows through a plain. Owing to the conformation of this region, the Italians were able to bring a cross-fire to bear on the Doberdo Plateau. The rocky nature of the Carso proved very disadvantageous to the Austrians and added to the losses suffered from the Italian artillery fire. Further, explosives had to be employed in connection with the construction of the Austrian trenches. The Italian artillery levelled the shallow Austrian trenches in this region in an exceedingly short space of time.

The absence of water was a most serious matter in the summer of 1915; many cases of madness were brought on in the Austro-Hungarian Army by thirst.

The line of the Isonzo was not a good line of defence for the Austrians; they could never have made any determined resistance on this line. As a matter of fact they abandoned the right bank of the river without firing a shot. A thin curtain of Austrian Landsturm troops alone held the bridgeheads and occupied the slopes of the Doberdo Plateau. At the end of May, 1915, this curtain proved sufficient to hold up the Italian advance and to cause the Italian Army to deploy for attack. In the meantime the Austrians moved up from 4 to 5 divisions to occupy the line Goritz-Monfalcone; these took part in the *First Battle of the Isonzo* at the end of June, 1915.

On the 9th July, 1915, the VII. Austro-Hungarian Army Corps was withdrawn from the Eastern Front and brought to the Isonzo in time to take part in the *Second Battle of the Isonzo* (18th July to 10th August, 1915). In connection with this battle 14 to 16 Italian Divisions attacked the Austrian front, Goritz-Monfalcone, the main blows being delivered against Mont San Michele and Monte dei Sei Busi. The Austro-Hungarians were obliged to abandon the salient opposite Gradisca, where their 14th Mountain Brigade suffered heavy losses and, in conse-

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quence drew back the central portion of their line. Calm reigned from the 10th August to 16th October, 1915, and the opportunity was taken by the Austrians to strengthen their defences.

The *Third Battle of the Isonzo* opened with an intense artillery preparation, lasting from the 16th to 18th October, 1915. The subsequent operations fall into four distinct phases:—

1. From 18th to 22nd October: Attack on the whole front, as far as the summit of Monte Nero.

2. From 22nd to 26th October: Violent attack against Austrian centre in the region Monte San Michele-San Martino.

3. From 26th to 30th October: Repeated attacks in the northern zone, specially against the bridgehead of Tolmino.

4. From 1st to 3rd November: Attack against the bridgehead of Goritz.

The battle reached its culminating point on the 25th and 26th October. Seven Italian Divisions delivered an attack against the VII. Austro-Hungarian Army Corps. The Italians captured the trenches at San Michele, but were driven out by counter-attacks delivered at night; they suffered very heavy losses. Finally the Italians captured the Doberdo Plateau, with the key to this position, Monte San Michele. The *Fourth Battle of the Isonzo* took place on the 12th November. The Austrian preparations for the coming battle are described in this number by the author of the *Revue* article; he accompanied the Austrian Headquarters on this occasion.—(*To be continued*).

On Discipline.

In this article Capt. Frederich criticizes the views on the above subject contained in the number of the *Revue* for October, 1916, *vide R.E. Journal* for January, 1917. He states that discipline, as known in Switzerland, does not consist in "a collection of rules and laws," but in the quality of devoting the whole of one's physical and moral strength to obtain victory, to prepare for it and to obey those who are responsible for this preparation; a quality which every soldier should possess. "What is wanted," he says, "is to inculcate in every body of troops the sentiment of strict obedience and to habituate every soldier to put forth his whole energy."

The means which should be employed to attain these ends are diverse and of varying values. "Drill," says Capt. Frederich, "has been proved to be the most efficacious of all these means, especially for an army which like that of Switzerland must be trained in an exceedingly short time." Drill is not an end but only a means to an end, and its educative value lies in the demand it makes on a man's energy, physical as well as moral. Drill is a preventative antidote against fear.

Hygiene and Militaire Medécine.

A medical officer of the Swiss Army describes in this article a card record which he has been using since 1913, as a means of keeping himself in touch with the state of health of the men whose medical care has been entrusted to him.

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Notes and News.

Portugal.—A special correspondent deals in a short contribution with Portuguese events of current importance. He points out that at the meeting of the Portuguese National Congress on the 7th August, 1914, the following motion of the Government was accepted unanimously: "Portugal, the Ally of Great Britain, will, under all circumstances, fulfil all her obligations as an Ally." On the 7th August 1916 (just two years later), the same Congress passed a resolution undertaking "to give full satisfaction to the invitation of the 15th July last of the Government of His Britannic Majesty requesting the closer military co-operation of Portugal in the European War."

The public declarations made by the Portuguese Finance and Foreign Ministers, on their return from the visits paid to England and France, at the meeting of the Congress last referred to, were decisive and particularly flattering to the national *amour-propre.*

The British Government has, it is stated, agreed to advance to the Portuguese Treasury the necessary funds in connection with the prosecution of the War; Portugal will repay sums so advanced two years after the signing of the Treaty of Peace. Great Britain also undertakes to supply Portugal with ammunition at cost price.

The Portuguese Prime Minister in his speech at the meeting of the National Congress of the 7th August, 1916, stated, amid continued applause, that when Germany spoke of the Portuguese as *vassals* she intended to say they were a people *true to their word.*

The visit of H.M.S. *Suffolk* and H.M.S. *Narcissus* to Portuguese waters, a few days after the meeting of the National Congress just referred to, for the purpose of saluting the Portuguese flag has caused lively satisfaction, as affording further evidence of the sincere and intimate bonds of friendship and goodwill which unite Great Britain and Portugal.

Things appear to be going well in Mozambique; the Portuguese after occupying the Bay of Kionga crossed the Rovuma River at Nhica. Two Portuguese warships co-operated with the land forces operating near the mouth of the river. A despatch of the 21st September, 1916, announces the capture by the Portuguese of a naval gun, 40 Mausers and a large quantity of telegraph stores, and also that the Portuguese have occupied Tshydia and Vocoto. A further despatch of the 23rd September, 1916, states that the British and Portuguese forces have established connection with one another north of the Rovuma; it also mentions that Mikindane has been occupied, 50 rifles and some ammunition being seized there.

Now that the British and Portuguese troops have joined hands, there is little doubt that the Germans will be driven out of the territory robbed by them from Portugal a few years back.

This number concludes with notices relating to books recently published; the majority of them deal with the present War.

W. A. J. O'Meara.

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CORRESPONDENCE.

QUICK RELEASE FOR STABLE BALES.

SIR,

2nd Lieut. Martin's suggestion of quick release is somewhat antiquated; the device or something very like it has been used in troop stables for fifty years and probably many more.

Perhaps he needs reminding that when a horse gets his leg over the bale he usually kicks out, and it is not always such a simple matter for the stableman to get at the sliding ring.

The automatic release is more useful in such cases; the device commonly employed is to have one of the links in the short chain open, *i.e.* sufficiently closed to hold up the bale under ordinary circumstances, but easily forced sufficiently open to break the chain when the weight of the horse is added to the weight of the bale. This contrivance was used at Aldershot in my Troop days and proved efficient.

Yours truly,
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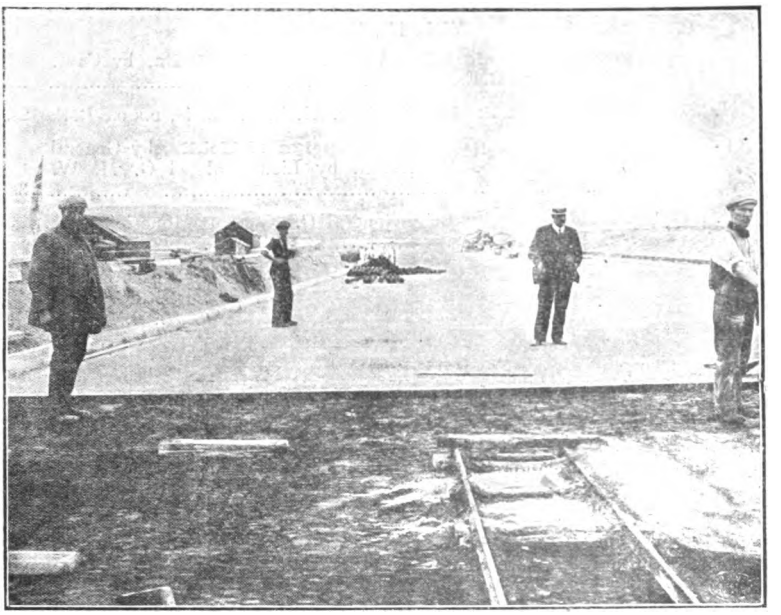

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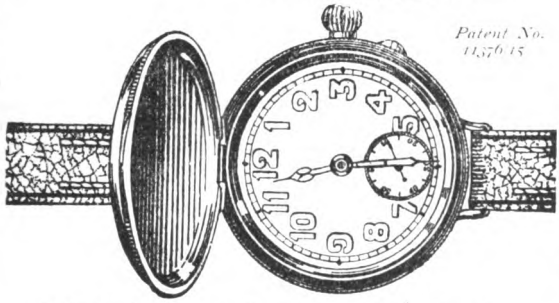

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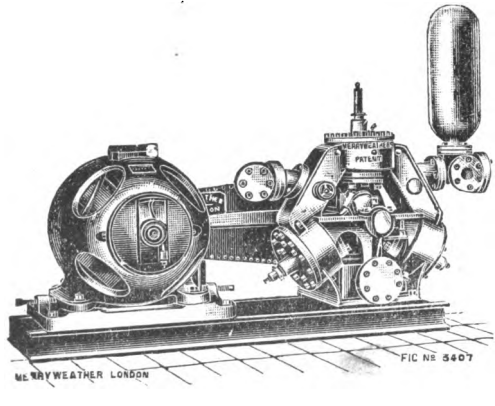

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*DEEDS OF THE ROYAL ENGINEERS.**

(Continued from the February number of the "R.E. Journal").

CHAPTER III.

THE ROYAL ENGINEERS AND THE BATTLE OF WATERLOO.†

IT is a curious fact that once in every hundred years one nation or another of the European family seems destined to be bitten with the old Roman ambition of dominating the Continent.

Another point in which history keeps repeating itself is that our own country invariably plays an important if not a decisive *rôle* in frustrating this particular ambition.

At the close of the 16th century Philip II. of Spain was aspiring to universal dominion, and it was Drake who "singed the King of Spain's beard" at Cadiz, and subsequently, under Lord Howard of Effingham, as Lord High Admiral of England, helped to scatter the self-styled Invincible Spanish Armada in 1588.

In 1704 the Duke of Marlborough and Prince Eugene shattered on the field of Blenheim once and for all the political structure that King Louis XIV. had for many years been endeavouring to consolidate in Europe.

In 1815—just a hundred years ago—the *coup de grâce* was given by the Duke of Wellington's Army at Waterloo to the greatest military genius of modern times, a genius who came nearer than any other man has ever done to the realization of Universal Empire, a feat that has been accomplished once and once only in human history—by Julius Cæsar.

Now that another Cæsar or Kaiser is pursuing the same object, and that Great Britain has once more descended into the arena to assist in frustrating the attempt, it will be interesting to recall the part played by our Corps in the last decisive campaign which settled the fate of Napoleon a century ago.

The Royal Engineers were not represented on that occasion by any complete unit of the Corps, but twelve of our officers received the Waterloo Medal. Two of these medals—those granted to the C.R.E. and the Brigade-Major, R.E., Lieut.-Colonel Carmichael

* Compiled in the R.E. Record Office.

† From *The Sapper* for June, 1915, being a Centenary article on the Battle of Waterloo.

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Smyth and Major John Oldfield—are to be seen in the R.E. Museum at Chatham. Another relic of Waterloo in the Museum is a Cross of the Legion of Honour, picked up on the field after the battle by Colonel Carmichael Smyth. By far the most interesting relic of Waterloo in the Museum, and probably the most valuable single item in the whole collection, is the map of the country round Waterloo which was used by the Duke of Wellington during the campaign.

The story of this map is so closely connected with the Corps that it may be of interest to follow its history from the day on which it was mounted on canvas in the drawing office of the Brigade-Major, R.E., in Brussels to the day when it found its final resting-place in the R.E. Museum, some four years ago. During the occupation of the Netherlands in 1814–15, after Napoleon's abdication and removal to Elba, Lieut.-Colonel Carmichael Smyth, who was C.R.E. of the Army of Occupation, under the orders of the Prince of Orange, had a number of reconnaissance sketches made of the country south of Brussels and adjoining the French frontier.

Napoleon made his dramatic escape from Elba on the 26th February, 1815, landing with 1,000 men in France on the 1st March. The news of this coup reached England about the 8th March, and early in April the Duke of Wellington took over the command of the Army in the Netherlands from the Prince of Orange. The Duke soon after his arrival secured the appointment of Sir William De Lancey, who had served under him in the Peninsula, as his Quartermaster-General. De Lancey reported his arrival in Brussels early in May.

The Quartermaster-General in those days was responsible for military operations, as well as for ordinary military movements, the General Staff as now understood not having yet been evolved. The R.E. assisted the Q.M.G.'s Department by making the maps required in military operations generally.

It was on the evening of the 15th June that the news that Napoleon had crossed the Sambre and was moving against the Allied Armies, reached the Duke's headquarters in Brussels. De Lancey spent that night writing the orders for the concentration of the army, and rode out early on the following morning to Quatre Bras with his Chief.

Now that it was clear where Napoleon's attack was going to be developed, maps were at once requisitioned from the C.R.E. One map of the open country south of the Forest of Soignies, traced from the original reconnaissance sketches made during the winter, had been already sent out to the Prince of Orange, who commanded the First Corps, and a second tracing was in course of preparation.

Lieut.-Colonel Carmichael Smyth joined the Duke's headquarters in the field as his C.R.E. on the 16th, and sent in to the Brigade-

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Major's Office for the plan of the country round Waterloo, which—as the C.R.E. knew—was being traced. The tracing had not, however, been completed, and as the matter was urgent, Major Oldfield forwarded the original sketches of the officers which had been pieced together and mounted on canvas. This map, now in the R.E. Museum, was entrusted by Major Oldfield to Lieut. Waters, R.E. This officer placed it in the sabretasche attached to his saddle and rode out with it to Quatre Bras.

When he arrived at Quatre Bras he found the battle in full progress, and was ridden over by a charge of French cavalry. "Upon recovering himself," writes Major Oldfield in his diary, "he found the cavalry had passed him, and his horse was nowhere to be seen. He felt alarmed for the loss of his plan. To look for his horse, he imagined, was in vain, and his only care was to avoid being taken prisoner, which he hoped to do by keeping well towards our right. The enemy, being repulsed in his charge, was returning by the left to the ground by which he had advanced. After proceeding about 50 yards, he was delighted to find his horse quietly destroying the vegetables in a garden near the farmhouse at Quatre Bras. He thus fortunately recovered his plan, and with it rejoined the Colonel."

Our troops were successful in holding their own against all the attacks of Marshal Ney that afternoon, and bivouacked that night on the field of battle. Soon after daylight next morning the Duke went over the position and made a few changes in the disposition of the troops in view of a possible renewal of the attack by the French. At about 6.30 a.m. he sent his Staff Officer, Sir Alexander Gordon, escorted by a squadron of the 10th Hussars, to find out what Blucher and the Prussians were doing on our left. Gordon and his escort returned with jaded horses soon after 10 a.m. The Duke, after all his work in the saddle, had dismounted and stretched himself on the ground near the cross roads, which gave the name of the Four Arms or Quatre Bras to the place. Around him, resting on the ground, were Lord Fitzroy Somerset (afterwards the Lord Raglan of the Crimean War), Sir Edward Barnes, the Adjutant-General, Sir William De Lancey, the Quartermaster-General, and others of his principal officers.

As soon as the Duke had heard Gordon's report of Blucher's defeat at Ligny and retreat on Wavre, he called on the C R.E. for the plan. Colonel Smyth took it from Major Oldfield (to whose custody it had been transferred on his joining headquarters) and handed it to the Duke. The latter handed it on, with a few words of direction, to De Lancey, who, seeing one of his officers, Lieut. Basil Jackson, close by, called him up and ordered him to go to Sir Thomas Picton to tell him the orders were to make immediate preparation for falling back upon Waterloo. It was no doubt at this

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juncture that the Duke made those pencil marks on the plan which are still visible, showing that the sunken road just north of the farmhouse of La Haye Sainte, and south of the village of Mont Saint Jean, was the main position to be occupied. At about noon the retreat commenced, and throughout the afternoon our troops were closely followed by the French, led by Napoleon in person. That night our troops bivouacked in the rain on the ground in the position indicated on the map in De Lancey's pocket.

There is no need to give any account of the battle on the following day—perhaps the most famous single battle in the whole range of English history—except to follow the fortunes of the map. Towards 3 o'clock the Duke and his staff were watching one of the great French attacks on the centre of the position. "We were," says the Duke, "on a point of land that overlooked the plain. De Lancey was with me, and speaking to me, when he was struck. I had just been warned off by some soldiers (but as I saw well from it, and two divisions were engaging below, I said 'never mind'), when a ball came bounding along *en ricochet*, as it is called, and striking him on the back, sent him many yards over the head of his horse. He fell on his face, and bounded upwards and fell again. All the staff dismounted and ran to him, and when I came up he said, 'Pray tell them to leave me and let me die in peace.'" The Duke had him conveyed to the rear to the farm of Mont Saint Jean, about half a mile off, whence he was subsequently removed to a cottage in the village of the same name, where he was joined by his young wife from Brussels a couple of days later, and nursed by her until his death, about nine days after the battle.

Before he was carried off the field the plan of the battlefield was taken from his coat pocket and handed to the Deputy Quartermaster-General, Sir Charles Broke, who handed it over to Major Oldfield at Cateau Cambresis, on the advance to Paris a few days later. Major Oldfield returned it to the C.R.E., in whose possession it subsequently remained. Sir Walter Scott met Colonel Smyth subsequently in Paris during the occupation of that city by the allied troops from 1815 to 1817, and heard from him the story of De Lancey's death, and of the map which had been pieced together in the C.R.E.'s Office in Brussels. "The plan itself," writes Sir Walter, "a relique so precious, was rendered yet more so by being found in the breast of Sir William De Lancey's coat when he fell, and stained with the blood of that gallant officer. It is now in the careful preservation of Colonel Carmichael Smyth, by whom it was originally sketched." Sir Walter Scott is not quite correct in saying that it was "originally sketched" by Colonel Smyth, but in his capacity as C.R.E., it was, of course, put together under his orders.

Some of the papers of Sir James Carmichael Smyth found their way into the open market some four years ago, and surely no more

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appropriate place for this precious relic, as Sir Walter Scott justly called the Waterloo map, could be found than the R.E. Museum.

The pencil marks of the Duke and the blooodstains of one of his favourite staff officers connect it with the most glorious episode in our military history; but its original construction by R.E. officers in the field and in the R.E. drawing office in Brussels, the vicissitudes it went through in Lieut. Waters' sabretasche on the 16th June, the endorsement of authenticity made on it by Major Oldfield in 1846, and finally its preservation by Sir James Carmichael Smyth connect it very closely with the Corps of Royal Engineers, and are a standing witness against the common belief that we have no special interest as a Corps in the most famous campaign in English history.

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CONSTRUCTION OF AEROPLANE SHEDS IN THE FIELD.

By CAPT. G. C. GOWLLAND, R.E.

THE following short account of some aeroplane sheds erected in Egypt may be of interest. There is nothing new in the design, but it is a good illustration of an active service project of a type that was set for promotion examinations in pre-war days.

The project was for four aeroplane sheds at a post 120 miles from rail-head. Camels were the only form of transport available at the time, and owing to the state of the road, ten days had to be allowed for a camel convoy to get through from rail-head to the site of the sheds. Each shed had to be 40 ft. long with a clear span of 40 ft. Height of walls 12 ft. 6 in.

The first calculations were rough. Trusses were spaced at 10-ft. interval and a dead load of 20 lbs. per f.s. calculated for. This gave an idea as to what stresses had to be dealt with. 20 lbs. per f.s. was considered too low a figure owing to the violent wind storms that were prevalent in the locality of the sheds. A second calculation was therefore made on the assumption that the sheds would be subjected to 100 miles per hour gale. The members were then calculated to stand somewhat less than the stresses set up by a 100 m.p.h. gale. The actual trusses will take a dead load of rather more than 40 lbs. per f.s.

During construction the sheds were subjected to a severe test in the shape of an extremely violent gale, but showed no sign of collapse. The stresses having been decided on, the material available locally had to be fitted to suit these stresses.

No timber over 13 ft. in length was available, therefore all members had to be built up. The scantlings available were 9 in. × 1 in., 8 in. × ¾ in., 4 in. × 2 in., all in 13-ft. lengths, while a limited quantity of 9 in. × 2 in. and 9 in. × 1½ in. was procurable, this latter being best quality deal. The Principals and Ties were made up of 9 in. × 1 in., while the 9 in. × 2 in. was kept for the short struts. The pillars supporting the trusses were built up of 8 in. × ¾ in. The details of this are shown on the working drawings.

The scheme for the erection of the hangars was proposed on 6th April, and the sheds were wanted by the beginning of May, as after the middle of May rain was likely to render flying impossible. The first train for the South left on 9th April, so there were 2½ days

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to design, estimate for, buy, and despatch the timber and ironwork required for the sheds.

A programme showing the progress of the work is shown below :—

6th April.—The General Staff ordered the scheme to be put in hand. On this day timber merchants were interviewed and some idea was obtained of the timber available.

7th April.—Plans got out, the design being made to fit in with the material available. The amount of wood, ironwork, corrugated iron, etc., was estimated and its weight calculated for purposes of transport. Tracings, etc., were made of the working drawings and specifications, etc., written.

8th April.—All material bought and loaded on the train, the total weight being 30 tons. At the same time a transport company of 250 camels was entrained, these latter being sent up to transport the material from rail-head to the site.

It was found impossible to make the steel fittings, straps, bolts, rods, etc., in time to go up by train on 9th April. Detailed drawings of these were got out and the steelwork was made by a local firm. All steel fittings were finished and loaded up by 12th April, when the next train left for the South.

9th April.—At 8 a.m. the camels and 30 tons of material left by train for the South.

11th April.—The material, etc., arrived at rail-head. The Officer in charge of Transport had to give his camels 3 days' rest as they were very cramped after the journey. Meanwhile plans and instructions as to the buildings were sent forward by a light motor car. This enabled the foundations, etc., to be dug previous to the arrival of the material.

15th April.—240 camel loads of material left rail-head for the site of the sheds.

26th April.—The camel convoy arrived at the site of the sheds. The material was taken over by a Military Works party and building operations begun.

2nd May.—The sheds were completed.

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TRANSCRIPT.

NOTES ON CAPTURED GERMAN DOCUMENTS.*

From the "Journal of the Military Service Institution, U.S.A."

THE summary of the information of various kinds given in documents captured from the Germans would be impossible owing to their number, and in the case of many of them inadvisable, but the following notes on a few of them, and of information from some other sources, should be of value.

I.—GERMAN ORGANIZATION OF TRENCHES.

The following are some extracts from a German document dealing with this subject. It will be noticed what important and complicated work the German Infantry is expected, in theory, to execute: the study of trenches captured from the Germans shows, perhaps not unnaturally, that the work carried out is, in practice, by no means so complete.

"Of the works necessary to complete the organization of the position, the first to be carried out are:

The deepening of the front trench and, *afterwards*, the construction of shelters.

As a general principle it is most important that no holes or excavations, other than those which are absolutely necessary, should be dug in either the front or rear faces of the trenches, though some are necessary for storing reserve ammunition and hand grenades.

Arm racks or rifle recesses should not be constructed, for later on, when the trench is bombarded by artillery or trench mortars, rifles cannot be left in the trench without cover.

One latrine per section must be dug: positions will be selected for this purpose. The latrines should be large and very deep, so that they may be usable for a long period."

"As regards shelters, exclusive of those of the company and section commanders, sixteen per section are required: each of these should hold from four to five men, and they should eventually be joined so as to form squad shelters. The entrance should be about five feet from the traverse and dug at right angles to the front face of the trench."

"The shelters should have a covering of from 13 *feet to* 16 *feet of earth*, as the position is certain to be bombarded. The descents should be at an angle of 40° to the horizontal and not vertical, in order to prevent their being blocked by a fall of earth. Particular care should be taken to strut the entrances to the shelters, for these are the points where there is a minimum thickness of earth and they are specially exposed to artillery fire. There should be signboards indicating the positions of the shelters."

* *The last number of the "Journal of the Military Service Institution of the U.S.A." contains a remarkably interesting series of notes contained in documents captured from the Germans. The Editor states that the notes are furnished from a source which, for conclusive reasons, cannot be revealed, but which is, in itself, a guarantee of their authenticity.*

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"There are in the front line trench just enough shelters for two sections: in the communication trenches there are enough for the remainder of the sections of the first line trenches: in the second trench there are enough for the supporting section. The design of the shelters in the communication trenches includes one entrance into the trench and another in the roof. In the second trench, which has hitherto been our principal trench, it is inadvisable to begin the construction of shelters at once, for it is essential to complete those of the advanced position first."

Remarks on the above. It should be noted that the German sanitary arrangements, as shown by the instructions given above, are by no means so thorough as those carried out in British trenches. A pit latrine is much less satisfactory and healthy than a latrine with receptacles which are emptied, and their contents buried, daily, in a deep hole well back from the lines.

With regard to the very elaborate instructions for the building of shelters, these show a wholesome, if excessive, respect for our artillery. It is doubtful if so many and such deep shelters are advisable. When the attack comes it is difficult to get the men out rapidly from underground, while men left in a shelter are like rats in a trap: they must surrender or be easily destroyed by bombs, as many of our successful raids on German trenches have clearly proved.

II.—Organization of Positions.

(Extracts translated from a German document).

"As a result of a visit of inspection by the pioneer general attached to General Headquarters the following points were discussed:

The higher command insists that a hostile attack, even though undertaken with superior forces, should be resisted to the uttermost, ground being maintained by the troops in their respective sectors. To this end it insists that, in addition to the principal position now occupied, there should be at least one alternative position. This position should be sufficiently far in rear to force the enemy to reform for a fresh attack and to occupy fresh artillery positions; but on the other hand in close enough proximity to command the first position, in order

(1) Either to prevent the enemy, who has set foot in it, from establishing himself there and gaining ground to the flanks, or

(2) To facilitate the recapture of the position later on. Each system of defence must be organized in depth; the following type is the simplest:

(a) A fire trench with obstacles, as a first line.
(b) A support trench, from 50 to 100 meters to the rear, more thoroughly organized for defense and provided with obstacles.
(c) Numerous communication trenches between the first two trenches.

It is necessary to classify the communication trenches, even those leading up to the second line, in order that those to be used, when going into and coming out of the trenches, may be kept distinct and marked by notice boards.

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It is necessary, on principle, to hold the fire trench: if a heavy bombardment forces the occupants to withdraw temporarily to the support trench, there must be no doubt as to the possibility of occupying the fire trench before the enemy can reach it. If, owing to exceptional circumstances, this is not possible, the support trenches must be defended. It is also advisable to prepare for defense certain portions of the communication trenches."

"Farther back, in rear of the support trenches, behind the more exposed portions of the front, block trenches, of such length as may be necessary, should be constructed in order to limit the progress of the enemy and facilitate the recapture of the position. Yet farther in rear, between the principal position and the second line of defense, it is desirable to establish intermediate supporting points; these also should check the enemy in his advance and facilitate the recapture of the positions."

"The different parts of a defensive system should receive a uniform nomenclature in such a manner as to show by their names the part they are called upon to play: relieving troops and new commanders will thus quickly find their way about."

"*Obstacles*—As far as possible fixed obstacles with iron posts should be employed: recourse to *chevaux de frise* and rolls of wire is only to be had in case of necessity. Nevertheless these latter must be held in readiness so as to improvise obstacles. Obstacles must be so arranged in front of the support trenches as to permit of easy egress therefrom, in order that the principal trench, if lost, may be retaken. To this end it is recommended that they should be arranged checkerwise, which admits of passage through them."

"*Shelters*—These must be bomb-proof and must be protected against earth-slides, as also their entrances. After a bombardment the exit is often obstructed by debris of wood, sand-bags, and even hurdles. There must, therefore, be several entrances. Isolated shelters are constructed to hold not more than two squads. A sufficient number must be built in all to shelter the entire permanent garrison of the fire trench * * * For commanding officers special bomb-proof shelters will be constructed * * * All commanding officers' shelters must be adequately connected up with the front firing line and the reserves."

"It is very important to have covered communications which will, in case of attack, permit of strong reserves being moved forward, or to a flank, and will afford protection against shell fire for a considerable time."

Remarks on the above. This document has been quoted at some length because it is typical of many. It is chiefly interesting because it shows to what lengths the German excessive desire for elaborate organization is apt to lead, viz. an instructional verboseness which is both unnecessary and causes a waste of time to the hard-worked regimental officer. The document itself is considerably longer, but nearly all that has been omitted is in the nature of repetition. It deals merely with the commonplaces of defensive organization and to a moderately trained officer its substance could have been adequately given in a dozen lines. It again provides evidence of the great amount of attention paid by the Germans to bomb-proof shelters.

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III.—German Minenwerfer Emplacements.

(From the examination of a prisoner, a minenwerfer N.C.O.)

Emplacement for a heavy or medium minenwerfer. On the right of the communication trench there is a shelter for the men. This is formed by a gallery 23 to 26 feet below the surface, with two outlets. Opposite this shelter a communication trench, provided with light cover, leads to the emplacement. In the middle of this communication trench there is a shelter for ammunition, a gallery 20 to 23 feet below the surface. The emplacement is formed of three rows of tree trunks 4 to 6 inches in diameter. On the left of the emplacement there is a small recess for tools. On the right there is an ammunition recess in which about a dozen shells are always stored. Behind the minenwerfer there is an exit (generally masked by a tent-square), by which the minenwerfer, after being dismounted, is introduced into or removed from the emplacement by night, when it is necessary to change its position.

The shelter sometimes consists, on the other hand, merely of an underground chamber placed at the end of a gallery opening on to a communication trench. This chamber is provided with an opening through which the projectile passes. This elongated opening, placed at a certain distance from a communication trench, is the only indication by which the existence of such a shelter can be ascertained from a photograph.

Emplacement for a light minenwerfer. The shelter is formed of one or two rows of tree trunks. As the minenwerfer never remains permanently in one position, the shelter is generally provided with light cover only, as is also the case of the shelter for the personnel. The shelter for the ammunition is formed by a gallery 10 to 13 feet below the surface.

Remarks on the above. German minenwerfer emplacements are constructed with considerable skill, but err on the side of elaboration. Concealment is of more importance than the safety of the gun or even the personnel, for once the emplacement is definitely located its destruction for all practical purposes is inevitable and a new position must be chosen. The two last-mentioned forms of emplacement are, therefore, preferable to the first, on the ground that, as they can be made quicker and with much less labor, and can be as well or better concealed, they fulfil essential conditions and alternative positions can be more rapidly constructed.

IV.—Dispositions to Be Made with the Object of Reducing Casualties in the Trenches.

(Extracts from a German document).

" The two following features have characterized, of late, the attitude of the enemy on our front.

Artillery activity has been chiefly displayed by night instead of by day.

Trench mortar fire has continually increased in intensity."

" *Our losses are unfortunately still too heavy.* Suitable steps must be taken to meet successfully this new method of fighting on the part of the enemy.

In the first place losses will be diminished by allotting *as small a garri-*

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son as possible to the trenches: the strength of these garrisons must be reduced, especially at night, to the minimum indispensable for the service of security and for carrying out the necessary work.

Further, every possible step must be taken to deprive the enemy's fire of its efficacy. This end can only be attained by a more methodical organization of the means of offense and defense."

"The situation varies in each sector: hard and fast rules cannot, therefore, be laid down, but the following conditions must always be observed:—

(1) The enemy must be subjected to continual observation, and this can only be done by having at our disposal a sufficient stock of illuminating material. * * * The officer commanding the corps pioneers must take the necessary steps to ensure that deficiencies in this material are constantly made good.

(2) The communication between the infantry and the batteries, or guns, told off to oppose the trench mortars must be close enough to enable every request for fire made by the infantry to be immediately complied with. There is room for great improvement in this respect. * * *

(3) Artillery commanders must continually increase the efficacy of their fire against the principal positions of the enemy's trench mortars by constantly improving their means of observation, especially by the provision of observation from a flank, and by eliminating all sources of error in shooting."

"Special precautions must be taken to effect withdrawal from the trenches when it is intended to open artillery fire on the enemy's trench mortars, which fire can only be delivered when the position of the latter has been exposed. If withdrawal is deferred till the hostile trench mortars have opened fire, the infantry runs the risk of incurring heavy losses in the course of a hasty retirement."

"In case the infantry should think fit to withdraw in haste from a section of trench, in view of our artillery opening fire, all arrangements must be made for immediately carrying out the order which emanates from the fire trench. * * * To this end infantry must practice withdrawing from the trenches quickly and in silence."

Remarks on the above. The most interesting point about this document is the indirect evidence it provides of the efficacy of our trench mortar fire. The losses caused by it are admittedly "too heavy." It does not speak very highly of the accuracy of German artillery that front trenches should have to be cleared so constantly, and often hastily, to permit of the German batteries opening fire on our front line. As we rarely, in like conditions, withdraw troops from the fire trench, it argues a greater irregularity of range in the German shooting or an increasing distrust of their ammunition.

V.—THE GERMANS IN OPEN WARFARE.

(*Information obtained early in the war from conversations with a German machine-gun battery commander, an expert in both musketry and machine guns. They are the views apparently held in the German army before the war, on which their training has been based, and there is no reason to suppose that there has been inclination, or even opportunity, to modify them to any great extent.*)

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(1) Musketry.

(a) *Range.*—The Germans consider it unnecessary to teach men to fire at distances beyond 400 meters. The plan of attack is to get within this range without opening fire.

(b) *Fire control.*—Judging distance is practiced by officers only, and no attention is devoted to indication of target, concentration, etc.

(c) *Concentration.*—To concentrate the fire of a platoon or company on one spot at 1000 yards range is considered to be a great waste of ammunition. The nearest the Germans do in this way is to fire by battalions on large areas of ground, using independent fire. On the Aisne this officer's machine-gun battery came under concentrated fire of our infantry at 1000 yards, and his men suffered heavily from it, but they could not see our men to reply.

(d) *British musketry.*—Our musketry, this officer said, was marvellous. They had counted on being able to rush us by weight of numbers, and found themselves quite unable to do it because our fire was " so straight and so quick."

(e) *Rate of fire.*—When asked if the Germans went in for rapid fire, he replied that only some of their men were practiced, and they only averaged eight to nine rounds per minute. (Their straight bolt is not so easy to work, nor is their clip so easy to put in.) They do not seem to realize that we train our men to fire fifteen well-aimed shots a minute.

(2) Machine Guns.

Each battalion has a company of four and sometimes six machine guns. Every man in this company is an expert in the gun. Each gun is considered to be worth fifty men or more. Their fire is considered to be the most valuable form of disharging bullets.

Training.—The Germans never worry about different elevations, combined sights, or traversing, and never fire on a 30-yards range, which is considered useless for training purposes. Machine gun competitions are looked on as far more valuable than rifle competition.

Tactical employment.—In the attack the machine guns are brought up with the supports and, until the war had been going on a month, it was not thought worth while to " dig in " the guns as their tactical employment was essentially with the infantry.

(3) The Attack.

The first line is looked on as " cover " from bullets for the second and third lines, to enable these two lines to get closer with the minimum of loss.

They reckoned on their third line with their machine guns being able to get within 400 yards. They have, however, never been able to do this over open ground against the British because their first line was down too soon—sometimes at 800 to 1000 yards. As this officer explained, they had never had a chance against the British.

They consider mass formation to be the only way to get up close, both ranks of each line being close together. If their third line is held up they have standing orders to " dig in " at once, and for this purpose the third line carry shovels and small picks.

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REVIEW.

PAGES D'HISTOIRE, 1914—1916.

(Librairie Militaire Berger-Levrault, Paris: 5, Rue des Beaux-Arts).

Continued from the R.E. Journal, February, 1917.

With the appearance of the 88th number the main title of the series has been altered by the editors to *Pages d'Histoire,* 1914—1916.

The 86th, 89th and 97th numbers contain the official communiqués addressed by the Central Government to the Provincial Civil Authorities in France; they are the XVI. to XVIII. Volumes (inclusive) of the series which deal with these matters. The 86th number contains the communiqués issued between 1st—31st October, 1915, the 89th number the communiqués issued in November and December, 1915, and the 97th number the communiqués issued in January and February, 1916; each of these numbers contains, in addition, appendices relating to the more important events which occurred during the period covered by the communiqués in them.

The 87th number is entitled *Les Terres Meurtries;* it contains 10 articles which give a description of the country on the French eastern frontier (illustrated by seven sketch-maps), in which fighting has been in progress since the autumn of 1914. These articles also refer to the characteristics of the people dwelling in this zone and to many of the incidents which have occurred there during the present War.

The author of the original articles states that the French plan of campaign was based on the assumption that the neutrality of Belgium would be respected, and for this reason the defences of the French eastern frontier were not carried sufficiently far northwards of Verdun. In this the French made a psychological error, which was, he says, aggravated by an inexcusable military mistake in the neglect by the authorities to provide the Spada gap with defence works. The enemy, being well aware of this point of weakness in the French system of defences, battered at this point of the French line and pierced it. Writing with particular reference to the Meuse barrier, he continues: "Of the whole French defensive system that part of the wall with which we have covered the Lorraine front, the flanks of which we rested on neutral countries, and which we thought to be impenetrable, is the only part of our front which the enemy has reached, attacked, and, at certain points, broken through. Everywhere else, the German effort, as great and as unforeseen it was by us, has not been able, in spite of its fury, to overcome any other of the obstacles to their advance put up by us."

The 88th number is entitled *Documents Authentiques sur le Complot*

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Austro-Allemand aux États-Unis and is a French translation of the White Paper, dealing with Austro-German intrigues in the United States of America, presented to the two Houses of the British Parliament on the 22nd September, 1915. In an introduction to this volume the editors state that for many months the Press had been publishing details concerning the Germanic intrigues in the United States of America. In the meantime the American and Austro-German governments had been discussing peace propositions, and a delicate situation had arisen. The editors point out that a veritable state of war existed between the United States of America and Germany at this time; the fact that war had not been declared made it none the less costly and murderous, with this peculiarity that the losses which resulted from this state of things alone injuriously affected the riches and lives of American people, without imposing any corresponding disadvantages on the German people.

War, Clausewitz has said, is an act of violence by which we compel our adversaries to conform his acts to our will. It is possible, as is well known, for two States to be at war with one another, although their armies may not be fighting one another, and although neither of the States may have declared war against the other. Violence exercised with the object of securing definite ends constitutes by itself a state of war; the outrages committed by the Austro-Germans against Americans fall in the category of acts of violence of this nature.

In the volume under review will be found some of the incriminating correspondence of the principal Teutonic intriguers during their sojourn in the land of the Stars and Stripes. Evidence was produced at a judicial enquiry ordered by the Washington Government proving that some of these gentry, among whom were numbered Dernburg, the German ex-Minister, von Papen, the German Military Attaché, and Boy-Ed, the German Naval Attaché, had flagrantly abused the hospitality extended to them by the United States of America, and, in consequence, no course was open to the American authorities other than to request that the German Government should recall their accredited representatives involved in the intrigues made public; and this was done. The Austro-Hungarian Government had been obliged earlier still to recall Dr. Dumba, its Ambassador at Washington, owing to the disclosures contained in the correspondence found in the baggage of the American journalist, James F. Archibald, on the 30th August, 1915, when the ship conveying the latter from America put in at Falmouth; this is the correspondence which is published in the number under review. Incomplete as is this correspondence, it affords most valuable evidence concerning the secret operations of German and Austrian agents on the American continent.

The 90th number is entitled *Voix Américaines sur la Guerre de* 1914—1916 and contains extracts from articles which have appeared in the American Press in connection with the present War. There are 10 articles in this volume. One of these taken from *The World* (New York) of the 23rd October, 1915, deals with the execution of Nurse Cavell. It is stated that the German psychology in the Cavell affair is as incomprehensible to the American mind as is the German psychology in the *Lusitania* affair; the execution in question was worse than a crime.

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In an article from the *New York Times* of the 3rd October, 1915, the situation in Germany at that date is briefly discussed. This situation is described as being similar to that where a chess-player who, having failed to win the game by a few daring moves, finds himself in a difficulty owing to the state of the board being such that he has no longer any piece left which he is free to move; whilst, at the same time, his adversary is handicapped by having no plan of attack, except that of exchanging pieces.

There are only two ways in war of beating an enemy: by killing his men or by making his troops prisoners. The arithmetic of the present War has from the beginning of the conflict been quite clear. Germany and Austria with a combined population of 115 millions have provoked a quarrel with other Powers whose total population amounts to 235 millions; that is to say, it is a struggle in which the eventual fighting strength is as 1 to 2. This disproportion is bound to tell in the long run.

The German Great General Staff recognized long ago that victory could only be sought on the lines of a *victory by strategy;* the arithmetic of the situation taught them that a simple competition in carnage would not answer their purpose. Hence the German plan of campaign, involving an early invasion of France *viâ* Belgium and the development of a subsequent magnificent and heroic effort to obtain a decisive success in Russia. The German plan has failed; and now the pressure exerted by the Entente Powers in the western theatre has become a serious menace to Germany. A miracle, and a miracle alone will allow her to escape from the impending disaster.

In an article from *The American Review of Reviews* of October, 1915, which appears in this volume under the title *Le Caractère français à l'Épreuve*, Dallas MacGrew, who has been with the American Ambulance in France, writes in highly appreciative terms of the French. He has seen much of the French officers and men, from both of whom he has learnt the true spirit animating the sons of *la grande France* at the present juncture.

In an article which appears in this volume, under the title *Les Allemands aux États-Unis*, Mr. Lucius Swift, a barrister of Indianopolis, makes an interesting examination into the growth of German power and the development of the new German mentality; the original of this article is a paper read before the Literary Club of Indianopolis on the 4th October, 1915. He calls attention to the fact that William II. has claimed that Germans were the salt of the earth; he also tells us that Germans in the United States of America, having accepted their Kaiser's *dictum* as the expression of the truth, have not been slow in pushing this view down the throats of Americans.

Germans in Germany and Germans and their descendants in the United States of America have, Mr. Swift tells us, expressed genuine surprise that Americans have no sympathy for the German Government in the present War, and, indeed, that they go so far as to hold the German Government to be a distinct menace to the liberty of the world. On the other hand, Americans are surprised that Germans should desire to claim their sympathy; specially in view of the fact that they find

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people of German descent, who, whilst enjoying all the advantages of American citizenship, continue to believe in William II. and are praying now for his triumph, because they look upon him as a sort of Moses who is leading Germans to the Promised Land. And to crown all things these German-Americans openly express the view that Prussian organization is preferable to American liberty. The growth of Prussia and the German Empire are traced from the time that an ambitious Hohenzollern purchased the Mark of Brandenburg from the Emperor Sigismund for half-a-million crowns. Considerable attention is paid by Mr. Swift to the reign of Kaiser William II. ; he points out that, in spite of appearances, the latter is no fool. William II. has set himself a definite task and has devoted himself strenuously and without intermission to its accomplishment. He has desired that he and his descendants shall continue to govern the Germans ; at the same time, he has resolved that, in the execution of the High Office of Supreme Lord of the German Empire, succeeding generations of rulers shall continue to employ the methods of the Middle Ages. For five and twenty long years William II. has sown the seeds of despotism ; his people have been poisoned by this canker. A feudal spirit prevails everywhere in Germany and has the approbation of the German-Americans ; they exhort the Germans of Germany to continue under this yoke.

The Zabern affair is referred to by Mr. Swift, and also the torpedoing of the *Lusitania* by orders of the German Kaiser. Leaving these subjects, he says: "It is with relief that one turns from this sovereign (*i.e.* the German Kaiser) to recall a classic example of the American political ideals." He recalls that, in 1783, after the last of the British and German soldiers had left American shores, Washington took leave of his generals at New York and returned to his estate to live the life of a simple farmer. The American General had commanded a great army to secure the liberation of a people, a *rôle* in marked contrast with that played by William II., whose aim and object in commanding a great army has been to enslave the people of Europe.

Dealing with the subject of German *Kultur*, Mr. Swift says, "Germans in America to-day disparage Treitschke ; they argue that this author's works are no longer read in Germany." Nevertheless, this well-known professor had a great vogue for 30 years ; he was listened to with deep attention and his opinions were often quoted. "It is useless," says Mr. Swift, "now that it is too late, and the faith in his doctrines has become so large a part of the German creed to disavow this prophet of German *Kultur*." He continues: "There is a wide difference in the ideals of the Anglo-Saxons and those of the Teutons." It is well put by Münsterberg, who says: "The Anglo-Saxon system is dominated by the individualistic influence ; the Teutonic ideal is governed by the will which seeks to rule the individual." That is to say, in the Anglo-Saxon system the welfare of the individual is the paramount consideration, whilst according to German conceptions individuals must blindly, in all things, obey the State as the representative of national civilization. It follows that Americans are unable, without sacrificing their own political ideals, to come to an understanding with the German-Americans. Americans can alone be in sympathy with those who

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represent the principles for which they have stood throughout their history. They well recognize that if Germany comes out top dog from this struggle, it will be America's turn to fight an adversary such as the world never before has seen.

An analysis and extracts are given in this volume from an article by Ex-President Roosevelt, which appeared originally in the *Metropolitan* (New York) for October, 1915. It deals with the question of the hyphenated Americans and their international obligations. This article concludes with the expression of opinion that every man in America who attempts to influence the policy of his nation in a manner not in conformity with the interests of the United States of America, but in a manner to favour the interests of the nation of which his ancestors or he himself was formerly a member, is an unworthy citizen and a bad patriot, who should make haste to quit the country in which his presence is only a menace to integrity and to honour.

The last article in the volume is taken from the *New York Nation* of 28th October, 1915; in it Mr. A. G. Keller deals with Colonial Prussianism. He is of opinion that the bureaucratic methods of the Germans and the strong caste prejudices of the Prussians do not conduce to success in the administration of a Colonial Empire.

The 91st number is entitled *La Prospérité Économique de l'Allemagne sa Place au Soleil et la Guerre.* Its author, Monsieur Gaston Cadoux, deals first with the Pangerman dream and begins by stating that, in his opinion, the falseness of the allegations by means of which Pan-Germanists have perverted German mentality cannot be too often exposed. Economists and statisticians cannot, in his opinion, use language too strong in terms for the purpose of denouncing the lies told to the German masses concerning the imperious necessity for Germany to break, by force of arms, the political and economic ramparts by which, it was falsely alleged, she was being hemmed in by her enemies and for her to conquer fresh territory, in Europe as well as outside it, which, it was falsely urged, had become indispensable to her existence owing to the immense growth of her population.

Monsieur Cadoux has carefully examined German records and compiled statistics therefrom, which show conclusively that Germany had a very considerable place in the sun; his figures, at the same time, disclose the untruthful nature of Pangerman assertions. From the day that the Germans abandoned their old standards and adopted new ideals, the be all and end all of which became the attainment of material and utilitarian ends, Prussian influence has asserted itself throughout Germany in the system of education which came into force in the Empire. This system of education caused the growth of a sort of mystic belief in the predestination of the German race. During the past half-century the German race has been nourished on the paradoxical teachings contained in Gobineau's *Essay on the Inequality of the Human Races* and on Nietzsche's *Theory of the Superman.* Thus it is that Germans have become imbued with the mischievous ideas for which the world to-day is paying the penalty.

" In the schools and in the barracks," says M. Cadoux, " the Prussian element, essentially brutal and reactionary, has caused, in the XX.

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Century, the hard dominating spirit of the Teutonic kind to come to life again after it had been crushed out. This spirit owes its re-birth to a political influence which, based on an electoral system excluding the mass of workers, has completely destroyed the democratic and humanitarian aspirations of 1848. Thus it is that the Prussians have caused the German peoples to oppose Europe by insisting that they, as an elect and superior race, were a kingly people, with the Kaiser as their prophet."

The numerical importance of the German race is next examined. Monsieur Cadoux shows that Germany has no foundation, on the basis of her population, for the claim advanced by her to supremacy in Europe. Out of a population, in 1910, of 423 millions of European extraction in Europe, the people of purely German descent numbered only 73 millions, *i.e.* about 17·25 per cent. of the whole. "It is hardly to be expected," says Monsieur Cadoux, "that 350 millions of human beings of other than German extraction will meekly submit to Teuton domination."

Dealing wth the question of vital statistics, Monsieur Cadoux calls attention to an interesting article which appeared in 1910, in a German publication, *The Economic Forces of Germany*, on the occasion of the 40th anniversary of the founding of the *Dresdener Bank*. In this article the following figures represent the increases of population in the countries named below:—

	Population in 1910.	Increase between 1875 and 1910. Per cent.	Excess of Births over Deaths in 1910. Per 1,000.
Germany	64,926,000	52	13·6
Great Britain and Ireland	44,902,000	37	11·0
France	39,600,000	8	1·8

In reply to Germany's complaint that her own territories are being overcrowded and it is necessary for her to acquire new colonies in order to find room for her surplus population, Monsieur Cadoux quotes figures from the 1911 Atlas by A. L. Hickman; these figures show that the average numbers (over a period of 10 years) emigrating from European countries have been as follows:—

	Per 100,000 of Population.
Ireland	1,960
Scotland	610
England	450
Italy	700
Denmark	250
Switzerland	160
Austro-Hungary	138
Germany	94
France	22

Further, so far as Germany is concerned the same publication shows that the emigration from Germany has in recent years been decreasing rather than increasing; from 1881 to 1890, 1,362,400 Germans left Europe; from 1891 to 1900, only 530,000 left the Fatherland, whilst in 1912 the figures dropped to 18,500. At the same time, there has

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also been an increase of foreigners immigrating into Germany; in 1900, 778,737 foreigners were living in that country; in 1905, 1,028,560; and in 1910, 1,259,873.

The German colonies, judging from figures published in the official *Statistical Annual of the German Empire*, do not appear to have proved very attractive to the Teuton. In the 30 years, 1884 to 1914, the total number of Germans in the German colonies had only increased by 19,108. The number of Germans in these colonies, in 1914, amounted to 23,952.

The sums deposited in the Savings Banks of a country are perhaps a truer index of the economic conditions of that country than anything else, since these sums represent, to a great extent, the accumulation of riches by the masses. How prosperous was the condition of Germany before the War is shown by the following figures relating to the Savings Bank Deposits extracted by Monsieur Cadoux from the publication, *The Economic Forces of Germany*:—Germany (in 1910) 16,780,568,000 marks; France (in 1910) 4,514,500,000 marks; Great Britain and Ireland (in 1909) 4,422,300,000 marks.

In the matter of her foreign trade also Germany had every reason to be satisfied. The relative increase of foreign trade of Germany and of her more important competitors in the 20 years, 1891 to 1911, are given by the following figures:—

Great Britain	65·9 per cent.
United States of America	69·8 per cent.
France	105·1 per cent.
Germany	143·1 per cent.

Monsieur Cadoux's detailed examination into Germany's economic situation provides, it is thought, a volume of evidence sufficient to convict the leaders of the nation of having cynically sacrificed the welfare of the masses, not for the purpose of realizing a great national ideal, but in the material interests of a small minority of reactionary capitalists and to satisfy the unworthy vanity of this minority.

The 92nd number contains a translation of Dr. H. A. Gibbons' article dealing with the massacre of Armenians in Turkey; the title given to the volume is *Les Derniers Massacres d'Armenie*.

In a preface to this article Dr. Gibbons states that, in a war of the magnitude of the one being waged at the present time, in which the men actually fighting have come from every inhabited quarter of the globe, it is naturally too early in the day for anyone to endeavour to form a definite opinion on the thousand and one problems to which the conflict has given rise; there are, however, certain matters on which it is neither politic nor wise to suspend judgment. To this class belong the massacre of Armenians in Turkey. "The crime has," says Dr. Gibbons, "been clearly proved; the responsibility for the same can, even to-day, be definitely established; an appeal can still be made to humanity on behalf of what remains of the Armenian race dwelling within the Ottoman Empire. The crimes committed against the Armenians constitute the blackest page of modern history." Dr. Gibbons deals with this matter in four short sections. In the first section he

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tells us that, in 1915, the Ottoman Government commenced to put into execution a systematic plan, carefully prepared, for the extermination of the Armenian race and that, within six months, nearly a million Armenians were massacred in cold blood. In the second section, Dr. Gibbons states that the Armenian race has never been and is not at the present time any menace to the security of Turkey. There is absolutely no justification for the accusation of disloyalty levelled against them by the Turks to explain the massacres and deportations carried out since August, 1914. In the third section, it is pointed out that the preservation of the Armenian element is absolutely indispensable in the interests of the welfare and prosperity of the Ottoman Empire. It has been proved, in the course of centuries, that Christians and Mohammedans can live together in peace and harmony in those parts of Turkey which are their common motherland. In the last section, Dr. Gibbons explains that Germany could, had she so wished, have prevented the work of extermination carried out by the Turks. She, however, preferred not to interfere; indeed, there are substantial grounds for the belief, which exists, that the German Government viewed with favour, and even encouraged, the removal of Armenians from Asia Minor in order to facilitate her own political and commercial schemes in the Ottoman Empire.

The volume concludes with a list of the sources of information drawn on by Dr. Gibbons for his article.

The 93rd number is a reproduction in French of the Second German White Book. The editors point out that the true import of parts of the German White Book cannot be appreciated without explanatory notes; in consequence, at their request Monsieur F. Passelecq, an eminent Belgian barrister, has prepared a critical analysis of the contents of the publication in question. This analysis precedes the despatches, etc., reproduced in the number of the series under review and is itself really a review of the German White Book. Monsieur Passelecq tells us that the Second German White Book was published under the direction of the German Foreign Office in March or April, 1915, under the title *Aktenstücke zum Kriegsausbruch.* It was preceded by an edition not so complete as the work just referred to. The earlier edition contained German and French versions of the matters contained therein, with the titles respectively of:—*Deutsches Weissbuch, Aktenstücke zum Kriegsausbruch, mit nachträglichen Ergänzungen—Livre Blanc, traduction autorisée, Documents sur les préliminaires de la guerre augmentés de documents nouveaux;* neither the name of the printers nor the date of issue is given. The Foreign Office edition of the German White Book contains 43 numbered despatches, etc., under 12 different headings, as follows:—

1. Memorandum laid before Reichstag on 3rd August, 1914.
2. Austro-Hungary and Serbia.
3. Extracts from German diplomatic correspondence.
4. A Belgian diplomat on the efforts made by Germany to avert war.
5. Exchange of views between Germany and Great Britain.
6. Interviews of Prince Lichnowsky and Sir Edward Grey.
7. Extracts from the history of the period preceding the War.

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8. Documents found at Brussels, I.
9. Documents found at Brussels, II.
10. British espionage at Brussels.
11. Fresh documents relating to the violation of neutrality by Great Britain.
12. Documents found at the residence of Grant Wilson, Secretary to the British Legation.

A translation of the great majority of the documents which appear in the German White Book have already been published in Number 25 of the *Pages d'Histoire* series (*vide R.E. Journal* for June, 1915), and these are therefore not included in the volume now under review.

Monsieur Passelecq's analysis is extremely interesting and very complete. He points out that a common distinguishing mark of German official publications is that they are incomplete and intentionally so. Of all the official publications issued by belligerents the Germans are the greatest sinners as regards the omission, etc., of important documents; they appear to have carefully excluded everything in the nature of evidence likely to destroy their case. Monsieur Passelecq is not satisfied with generalizing on this matter, but gives specific instances to support his statement. He expresses the opinion that the true and principal reason for the publication of the Second German White Book lies in the fact that it was desired, in official quarters, to remove the painful impression created by the speech of the Imperial Chancellor, at the meeting of the Reichstag on the 4th August, 1914, when he attempted to justify the violation of Belgian neutrality in language which caused consternation throughout the German Empire, owing to its cynical frankness. Since then every effort has been made to destroy the true meaning of the terms used by the Imperial Chancellor on this occasion.

In this White Book an attempt is made by the German Government to show that at the time Belgium was complaining that her territories had been violated, she had already abdicated her position as a neutral and had surrendered herself and her sovereignty into the hands of Great Britain.

Three means are employed by the German Government to prove its case:—

1. It omits systematically to disclose to the public the replies made by Belgium to German demands and to the official accusations of Germany.

2. It makes public a *dossier* made up of documents found at Brussels in which the question of the invasion of Belgium is dealt with; these documents are *fortified* by *translations* and notes which have been subject to *skilful* (!) editing.

3. It completely distorts parts of the text of the documents published.

Monsieur Passelecq states that he does not intend to discuss the question of the violation of Belgian neutrality; the subject has been amply discussed, among others in the following publications:—

De la Violation de la neutralité belge, by J. Van den Heuvel (Le Correspondant of 10th December, 1914), *La Belgique neutre et loyale* by E. Maxweiler, *La Violation de la neutralité de la Belgique*, by P. Hymans

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(No. 20, *Pages d'Histoire* series), *L'Allemagne avant la guerre : les causes et les responsabilités*, by Baron Beyens, *La Neutralité belge*, by H. Welschinger, *La Violation de la neutralité belge* and *luxembourgeoise par l'Allemagne*, by André Weiss.

It is pointed out by Monsieur Passelecq that the neutrality of Belgium was not *one of election*, but an *imposed neutrality*. Belgium, therefore, had no liberty of action ; on receiving the German ultimatum she was bound to appeal to the other guarantors of her neutrality for protection, and she did so.

Cases of omission, falsification and mistranslation are fully dealt with by Monsieur Passelecq with the aid of photographic reproductions. One of the most glaring attempts at deception practised by German officialdom was the substitution of the word *convention* for *conversation* appearing in a minute prepared by General Ducarne in relation to a discussion which he had with Colonel Barnardiston on the subject of a possible invasion of Belgium by Germany. This substitution of one word for another in the minute in question was made the basis of an allegation that a Secret Treaty of Alliance had been entered into between Great Britain and Belgium published broadcast in a pamphlet printed in German and French—labelled *Kriegs-chronik* on one side and *Journal de la Guerre* on the other. When this fraud was exposed, a second edition of the above pamphlet was published with certain corrections, in order no doubt that this edition could be produced to deny the truth of the charge as to substitution of words, mistranslations, etc. The bad faith of the German Government is shown by the fact that nothing was done to call attention to the corrections made, which could only be discovered by a careful comparison of the two editions, followed by an enquiry as to the necessity of the alterations.

A study of Monsieur Passelecq's analysis in the original will well repay the time spent on it.

This number concludes with an appendix containing articles from various sources collected by the editor of this number of the series in order to add to the completeness of the volume. These articles contain an extract from the Imperial Chancellor's speech at the Meeting of the Reichstag on the 2nd December, 1914 ; an extract from the *Norddeutsche Allegmeine Zeitung* of 28th August, 1915 ; an extract from a German-Swiss newspaper dealing with the purport of the " Barnardiston documents " ; an extract dealing with the reasons which prompted the Belgian General Staff and the British Military Attaché to study the problem of the German invasion of Belgium ; General Bernhardi's views on the violation of Belgian neutrality and the French plan of concentration ; the defence of Belgian neutrality, and the causes which determined Belgium to act as she did.

The 94th number is a diary of the War, and covers the period 1st July to 31st December, 1915.

The 95th number is entitled *Voix de l'Amérique Latine*. Gomez Carrillo deals with *The German Peril in Latin America* in a preface to this volume. This preface opens with a cutting sent to Mr. Carrillo by a friend who occupies a very prominent position in the Argentine

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Republic. This cutting reads: "In the *Daily Mail* one reads that at a luncheon given at the Travellers' Club, at New York, to Mr. Alfred Noyes, he showed his hosts an atlas recently published in Germany, in which large tracts of territory in South America belonging to Brazil and to the Argentine Republic are coolly represented as being German colonies." It would appear that many other publications of the sort referred to in the *Daily Mail* have found their way to South America, but prior to the War no importance was attached to them. The War has, however, opened the eyes of the peoples of the South American Republics and some of them have begun to make enquiries as to the chances of the continuance of the independence of these Republics should Germany triumph over the combination of powers battling against her efforts to dominate Europe.

Mr. Carrillo tells us that so far as he is personally concerned he could never have believed that any European Power would have had the madness to dream of converting the Argentine, Uruguay and Chili into colonies were it not for the documentary evidence showing how real the peril of such a catastrophe had been owing to the designs of Pan-Germanists. He points out that from the time of the appearance, in 1903, of Wilhelm Sievers' work *Sud-Amerika und die deutschen Interressen* up to the outbreak of the War no year has passed without the appearance of some works dealing with German aims in South America. The earlier works speak of German *influence* only, but the authors of the later works do not hesitate to write openly regarding the German desire for the acquisition of new colonies in the New World. An extract is given from the preface of Sievers' work in which no room is left for doubt as to the aims of Germany; he openly advocates a German alliance with Russia —"who has," says Sievers, "no interests in South America"—in order that the United States of America should be held in check and the commercial competition of Great Britain defeated. Attention is also called to Rienner's *Ein pangermanische Deutschland*, in which its author boldly claims that South Americans would welcome the assistance of German power and capital as a material and moral force wherewith to combat their natural enemy, the United States of America.

The most significant and striking statement dealing with Pangerman aims, it is pointed out, is that contained in Friedrich Danger's *Reines Deutschtum*. This work contains the following advice:—"A policy that is far-seeing should provide for the employment of adequate means for directing emigration in such a manner that the vital interests of individuals may conform to those of the State. Such a policy is one where, by the resolute application of the forces to hand, the necessary Treaties can be negotiated with other States on such terms that emigrants shall be received on a footing which corresponds with the views of our Government. States divided internally, such as the Argentine Republic, Brazil, and, more or less, nearly all those miserable republics of South America, should be induced by honeyed words or by force to give attention to very significant hints."

Gomez Carrillo does not hold the German nation as a whole responsible for the extravagant ideas of Germans which he exposes. But, he tells us, his Latin soul naturally makes him a fanatical admirer of

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the culture which is the incarnation of France and causes him to pray unceasingly for the triumph of the Allies.

This volume contains 25 articles contributed by leading citizens of the various South American Republics. The perusal of these articles creates but one impression on the mind and that is that the majority of the residents in the Southern Continent of the New World are strongly in sympathy with the cause of the Western Entente Powers and are keenly alive to the peril in which they would be placed did the Central Powers emerge victorious from the present conflict.

The 96th number is entitled *Problèmes de Guerre;* it contains two papers read by Professor Alglave at the Conservatoire National des Arts et Métiers, Paris. The first of these papers is entitled *Le Droit de la Guerre autrefois et aujourd'hui* and was read on the 21st December, 1914; in it Professor Alglave deals with the customs and laws of war in remote ages and traces the changes which have taken place in these customs and laws since the dawn of civilization up to recent times. He points out that it has been due, at times, to utilitarian reasons, at others, to philosophical reasons that the evolution in the customs and laws of war that we see have taken place. In the 18th century there took place a change analogous to that which was introduced 18 centuries earlier under the influence of Christianity and stoicism. The author of this new policy was Jean Jacques Rousseau, a Frenchman resident in Geneva; he was the creator of the main principles which have been incorporated into the code of ethics accepted by civilized societies in modern times. Rousseau's creed is based on the doctrine of the sovereignty of the people; the Germans have never accepted this doctrine.

Rousseau held the view that: "When two peoples are in conflict with one another, the two States to which they belong are at war, but not the individuals composing those States. The two States constitute entities, bodies completely distinct from the individuals composing them." These views were a complete negation of the former ideas on the subject.

Later Kant, the German philosopher, propounded similar views, but his views do not prevail in the modern Germany of to-day.

Professor Alglave deals next with the atrocities committed by German soldiers in the course of the present War. With the progress of time has come yet another change in the customs and laws of war, which unfortunately shows a retrogression in manners on the part of one of the groups of belligerents. He concludes in the following terms: "The German desires that all citizens shall be the slaves of the State; we ourselves desire that citizens, even during a war, shall be free, representatives of liberal ideas and not instruments of the drill-sergeant and of militarism."

The second paper is entitled *Comment on paie en temps de guerre* and was read on the 21st January, 1915. The subject is subdivided into three sections: Individuals, the State, the Nation.

The Professor deals in this paper with the measures adopted on the outbreak of war to overcome difficulties in connection with the stringency of markets owing to the withdrawal of metallic coinage from circulation, to the liquidation of running accounts, to the impossibility of

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completing contracts; he touches upon the loans raised and other expedients adopted to provide funds for the conduct of the War, the measures taken to prevent violent fluctuations in the rates of exchange, to reduce the depreciation in the value of securities representing the public funds. Individuals as well as States have been obliged during the War to live to a great extent on credit. The question is who shall eventually pay the cost of the War; there may be some who may have made up their minds on this subject. If there be any such among the readers of the *R.E. Journal*, they should ponder over the following remark of a German professor:—"But ourselves also, we are determined to fight to the bitter end. It is not alone a question of hegemony; the very existence of Germany as a great Power is at stake. We will spend our last farthing, expend the blood of our last soldier, and if we are beaten, you will have to deal with a nation with empty coffers, incapable of paying you the smallest sum, in fact with a completely bankrupt nation." Professor Alglave expresses the opinion that the above is an exaggerated view as to the situation which will exist when peace reigns once more.

The 98th number is entitled *La Guerre Aérienne;* it deals briefly with the *rôle* of the Fifth Arm and is provided with 24 illustrations of aeroplanes, etc., and a sketch-map showing the places attacked by British and French aviators. The contents of the volume are divided into seven short chapters headed: History of Aviation; Aviation in the Armies of the Various Belligerent Powers; *Rôle* of Aeroplanes; Explosives and Missiles used by Aeroplanes; Attack of Aircraft by Gunfire; Exploits of our Aviators and those of the Allies; Fight for the Supremacy of the Air.

The 99th number is entitled *La Conquête de l'Autriche-Hongrie par l'Allemagne;* it has the following sub-title:—*Une Nouvelle Forme du Pangermanisme le "Zollverein."* Monsieur Adrien Bertrand, the author of the volume, discusses the subject in eight short sections; in the first of these he deals with the "German plan." Germany is, he tells us, in the act of completing her conquest of Austria-Hungary. It is for possession of the heritage of the Hapsburgs that Prussian and Bavarian troops have painted red the banks of the Marne, the Yser and the Meuse, and that they have also sown the wide plains of Poland with the bones of their companions-in-arms.

It is said to be a fact that the German Emperor reigns in Austria-Hungary to-day; the domination of the Dual Monarchy is what he hopes to gain from the conflagration which he has started These designs cannot be proclaimed openly but are being pursued under cover of a proposal that the two Teutonic Powers of Central Europe shall establish closer internal relations by entering into a Customs Union; that is to say, a *Zollverein*, it is thought, will bring about the realization of the Kaiser's dream. The creation of a Central European Empire, the *Mittel-Europa* of Pangerman visions, is a proposal which the German Emperor has only in very recent years been in a strong enough position to discuss with the Austrian Emperor; it originated with the *Weltpolitik* of William II., which had its birth after Bismarck's fall. This *Weltpolitik* was really founded on the *Deutsche Politik* of the Iron Chancellor. Pan-Germanists have been foiled in their ambitions

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regarding territorial aggrandisement owing to the difficulty experienced in crushing the Western European Powers and Russia; in revenge they have adopted the *Zollverein* as the watchword of a new policy. It is for the Entent Powers to see to it that this policy has as little chance of success as the *Weltpolitik* it is intended temporarily to replace.

The second section of the volume deals with the Pact of Konopicht. Monsieur Bertrand recalls the meeting between William II. and the late Archduke Francis Ferdinand at the latter's home at Konopicht, in Bohemia, on the 12th June, 1914. It was on this occasion that, it is thought, an agreement was come to regarding the great European War which was to result in the rearrangement of frontiers in Europe. The Kaiser was in a strong position in negotiating with the late Archduke Francis Ferdinand. On contracting his morganatic marriage with the House of Chotek, the late Archduke had necessarily to renounce the succession to the Austrian Crown on behalf of the issue of this marriage. He, however, seems to have cherished the idea of repudiating this renunciation should a favourable opportunity occur; it is of this situation that William II. is said to have taken advantage.

At the meeting in question William II. succeeded, under the guise of a Customs Union, in laying the foundation of the Central European Empire and of paving the way to the hegemony of his House.

The origin of the War, Monsieur Bertrand points out, is clearly indicated in Mr. H. W. Steed's article which appeared in the *Nineteenth Century and After* for February, 1916; extracts are given from this article. In brief, Mr. Steed, it may be remembered, tells us that the Austro-German plan consisted in provoking Russia to extremes. Austria and Germany hoped at the same time to reduce France to impotence straight away and had little doubt but that Great Britain would remain a passive spectator during these proceedings. Had the plans formulated at Konopicht not miscarried, the intention was, it is said, to divide the Austro-Hungarian monarchy into three parts, as follows:—

1. A newly-constituted Kingdom of Poland stretching from the Baltic to the Black Sea was to have the late Archduke Francis Ferdinand as its first king; his eldest son, Maximilian Charles was named as his successor to the Crown of this Kingdom.

2. Hungary, with which was to be incorporated Bohemia, Serbia, Bosnia and the Croatian and the Slav countries in the south, was to form a second kingdom; Prince Ernest, the murdered Archduke's second son, was nominated king of these territories.

3. The remainder of Austria was to constitute a third kingdom; the Archduke Charles Francis Joseph—the present Emperor of Austria—it was intended should remain the heir presumptive to this residue of the dismembered Dual Monarchy.

This newly-constituted kingdom of Austria was eventually to enter the folds of the German Empire as a Confederate State, in order to form a greater Germany.

Lastly, to complete the new organization in Middle Europe a military and economic alliance, on a narrow and perpetual basis, was to be formed, of which alliance Greater Germany, the reconstituted Kingdom of Poland and the new Bohemian-Hungarian-Slav Kingdom were to

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be members. These were to be the partners of the *Zollverein* of the XX. Century.

This Teutonic Alliance was intended to act as the arbiter of the destinies of Europe ; it was to dominate the Balkans and thus to control the route to the east. Count Tisza was very probably aware of the Pact of Konopicht. It is said that " After the assassination of the late Archduke Francis Ferdinand, his private papers at his Bohemian home were seized by an Imperial Commission. On learning at Kiel of the murder of the heir to the Austrian throne, William II. exclaimed that it was necessary to commence afresh his negotiations in relation to the Austrian situation. No time was lost in taking steps to hurry matters forward. Tisza was ready. War broke out."

William II. was, it is said, bent on war ; he was convinced that overproduction in the industrial world of Germany made war a necessity. Germany had been working towards war for half a century. Austria-Hungary was also ready. The Krupp house controlled the Skoda factories ; Austria had the best heavy artillery in the world. Tisza, aided by his accomplice, Count Forgatch, prepared the way for a stroke of the Bismarckian order which must unfailingly lead to a conflict of arms.

The third section deals with the problem of the Central European Empire, the " *Mittleeuropa* " of Pangerman dreams. The deep-laid designs of William II. having miscarried, owing to the victories on the Marne and the Yser and to the fact that Great Britain, France, Russia and Italy are standing shoulder to shoulder, Germany cannot at once expand at the expense of her enemies. She, however, hopes to do so at expense of friends ; hence, the idea of a Customs Union. The Customs Union, nevertheless, still involves the hegemony of Germany. It is said that there will be no opposition to such an Union on the part of the Austrians, with whom William II. is a greater favourite than was the late Emperor Francis Joseph. The Hungarians too are not likely to offer any strenuous opposition now that the Kaiser's troops have chased the Russians back from the Carpathians. It is the accord in the Dual Monarchy on this subject that constitutes the gravest danger for the Entente Powers. The creation of a *Zollverein* in Middle Europe cannot be prevented, all that can be done is to circumscribe the peril created by its existence. Towards this end, measures should, it is urged, be adopted to restrict the extent of territory which Germany desires to bring into this combination. Put in other words, in the Kaiser's latest proposal the problem connected with the dismemberment of the Dual Monarchy and the building up of a new confederation on its remains reappears in a somewhat different guise. If William II. should decide to annex Austria and Hungary, the Entente Powers, it is said, can do nothing to prevent this being carried out so long as Austria and Hungary aid and abet in its accomplishment. Austria and Hungary are the nebulæ round which is to grow the *Mitteleuropa* of the States to be freed from the yoke of the Entente Powers.

An Austria-Hungary, diminished by the Trentino, the provinces of Istria and of Dalmatia (become Italian), Bosnia and Croatia, the Roumanian regions of Banat, Transylvania and Bukowina, Poland (constituted an independent State), and Bohemia would not, in federation with

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Germany, form a Power so formidable as to give the Latin and Slav Powers in alliance any serious alarm. "Germany's whole interest," says Monsieur Bertrand, "is then to maintain in its integrity the hold of the Teutonic Powers on all that is contained in the present Dual Monarchy, in order to annex its subject peoples to the Central European Empire of Pangerman visions. The whole interest of the Entente Powers is to effect the liberation, by their arms and in the cause of the eternal principle of nationalities, of the down-trodden peoples on the fringes of the Dual Monarchy."

Political union of the Teuton Powers would assuredly follow their entry into a Customs Union, and thus would be realized in a practical form the dogmas of the *Welthandel*—world commerce—directly issuing from the *Weltpolitik*. It is said that the journey made by William II. to Vienna, in December, 1915, was for the purpose of discussing with the late Emperor Francis Joseph his altered plans consequent on the impossibility of obtaining fulfilment of the engagements in the Pact of Konopicht. The outcome of this meeting was that progress was made both in relation to the *Zollverein* question and the problem of Poland.

The success of the Kaiser's generals, about the period under discussion, in liberating Galicia and in crushing Serbia led Austria to think that her own ambitions had been realized, the objects of the War attained. William II. magnanimously offered to hand over Russian Poland to Austria, but Prussian Poland was to remain, as formerly, a part of the German Empire. But Hungary has been quick to recognize that the substitution of a Triple Monarchy for a Dual Monarchy will weaken and not strengthen the position of the Emperor-King. However, Hungary, with a population equal to that of Austria and richer in possibilities, stands to gain by this arrangement; she would become the predominant partner of the Triple Monarchy. Austrian Poles would, it is said, be satisfied with such a solution of the problem; they have enjoyed considerable political liberty under the Hapsburgs.

At first, the latest plans of William II. did not please his own people; but the idea of a *Zollverein* has now been made acceptable to them. The inauguration, when peace reigns once more, of such a Union would be but a step towards the adjustment of the whole situation to Germany's advantage; Dr. Helfferich will be able, it is expected, to complete the work of Field Marshal Mackensen.

The realization of Germany's latest schemes would eventually place at the disposal of William II. and his shipping magnates ports of the greatest strategic and commercial importance. Hence the necessity on the part of the Entente Powers for defeating the latest Pangerman scheme.

In the fourth section, Monsieur Bertrand calls attention to the reply made by the Imperial Chancellor to the interpellation by the social democrats at a recent meeting of the Reichstag, and particularly to the following remark made by him:—"A solid bridge has been thrown between the Central Empires which are now indissolubly united. When peace reigns once more, this bridge will no longer be required for the use of battalions on the march; it will instead serve the purposes of works of peace and of civilization."

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Although no one in Vienna appears to have raised any protest against the above proposal for a close economic union between Germany and Austria, it was otherwise in Hungary. Count Andrassy, leader of the opposition in the Hungarian Parliament, did not hesitate openly to declare that Hungary was not willing to accept Germany as her feudal lord. He has summed up the situation in the following terms:—" The military and diplomatic independence of Austria-Hungary is dead. We are minors placed under the tutelage of Germany. A twelvemonth ago we lost the right to have a diplomacy of our own and an independent army; Germany dictates what we must do." These protests have been of little avail. There is still a show of resistance in Hungary to German demands, and the accomplices of William II. have to exercise caution in openly acceding to his wish that Austria-Hungary should accept the supremacy of the Hohenzollerns by entering into an immense Germanic Confederation, the capital of which is to be located in Berlin. William II. seems to have been successful in inducing the late Emperor Francis Joseph to dismiss officials in high positions who were opposing the former's schemes.

The fifth section discusses the Pangerman doctrine concerning the *Zollverein*. The Pan-Germans point out that Great Britain, the United States of America and Russia between them control 55 per cent. of the surface of the globe and can by erecting tariff barriers completely crush the States of Central Europe; it is to meet such a contingency, they argue, that the *Zollverein* has become necessary.

In the sixth section is traced the development of German plans from the time of the inauguration of Bismarck's *Deutsche Politik*; his formula being, " Prussia to rule Germany and Germany Central Europe." The first part of this programme was realized; since 1871 Prussia has been supreme in Germany. William II. followed with his *Weltpolitik*; his formula being: " Germany to rule Central Europe and Germanized Central Europe the world." The world now awaits the decision as to its final destiny.

In the seventh section the subject is further pursued and William II.'s *Weltpolitik* and the scheme for the commercial domination of the world are investigated.

Monsieur Bertrand examines the enormous growth in Germany's mercantile fleet. The following comparative figures are given:—

	1871.	1891.	1914.
Number of steamships	2,437	2,412	4,000
Total tonnage of ditto	532,000	1,000,000	3,000,000
Number of seamen employed	21,000	29,000	80,000

It may be remembered that it was in 1900 that William II. proclaimed his new naval policy: " *Unsere Zukunft liegt auf dem Wasser.*" (Our future lies on the water). This policy has already borne fruit and before the present War broke out the Germanic States had become the universal providers of the world. In the 44 years elapsing since the Franco-German War the imports of Germany had more than trebled and her exports had nearly quintupled. Had the Kaiser had but a little

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patience in a few years more the conquest of the world would have been completed for him by the pacific infiltration of his people and the Germanization of the commercial and industrial undertakings in all civilized lands. But Germany was in a hurry to acquire commercial ports, such as Amsterdam, Liverpool and Antwerp, and a war was the only means of speeding up the attainment of this end.

In the last and eighth section, Monsieur Bertrand points out that economic reasons connected with over-production beyond the Rhine are the cause of the present War. Germany's hopes are now turned to the question of founding a *Zollverein* which will allow her to become rich and eventually to dominate the world.

The Entente Powers, on the other hand, are bent on liberating the peoples of small nationalities oppressed by their powerful governors. Their hopes are centred in the restoration to Italy of regions, under Austrian rule, inhabited by peoples of the Italian race; the creation of a southern Slav kingdom, with Serbia as a nucleus; the liberation of Roumanians now under the yoke of Hungary and their annexation to their motherland; the reconstitution of a kingdom of Poland; the liberation of the Czechs of Bohemia and of Moravia from the yoke of Austria and the creation of a new kingdom wherein these people may enjoy a national life to their liking. "We have made war," says Monsieur Bertrand, "on behalf of the principle of nationalities. Do not let us forget it; with this is bound up our pride, our strength and our interest."

The 100th number contains the diplomatic correspondence which appeared in the Second Belgian Grey Book. It covers the period 22nd February, 1914, to 6th April, 1915. There are 123 despatches in this number, many of them having Appendices attached to them.

The volume is divided into two parts; the first part is headed "Diplomatic Correspondence relative to the War of 1914—1916," and the second part "Protests of the Belgian Government on the Subject of the Infractions of the Customs of War and notably of the Hague Conventions." The despatches in the first part of the volume deal, *inter alia*, with the intrigue carried on by Germany with a view to ousting Belgium from the Congo region, the representations made by the Belgian Ambassadors at Berlin and Vienna to the Foreign Office at Brussels in relation to Austro-Serbian affairs, the final experiences of these two gentlemen before quitting, on the declaration of war, the countries to which they had been accredited; the German ultimatum to Belgium and the spirited reply made by Baron Beyens, the Belgian Ambassador at Berlin, to Herr von Jagow when the latter informed him of the demand which was being made on the former's sovereign; the German intrigue at Constantinople which drew Turkey into the War, etc.

In the second part are set out the various protests and representations made by the Belgian Government in respect of the German accusations against the civil population of Belgium; the illegal seizure of the funds in the Belgian banks; the bombardment of Antwerp by Zeppelins; the use of dum-dum bullets by German troops; the German accusation that Belgium had entered into a treaty with Great Britain in conflict with her obligation to maintain neutrality, etc.

W. A. J. O'MEARA.

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NOTICE OF MAGAZINE.

REVUE MILITAIRE SUISSE.

No. 12.—*December*, 1916.

EDITORIAL NOTICE.

The editors of the *Revue* call attention to the fact that during the past twelve months they have experienced considerable difficulty in conducting their journal. They announce their intention to spare no pains to ensure the success of the issues of the current year and further that the scope of the *Revue* is to be widened.

The preponderating influence played by inventions in the technical domain during the present War is now fully recognized by everybody; the editors propose to give the readers of the *Revue* an opportunity of following the developments in the field of invention affecting armies.

The applications of features borrowed from naval science to land warfare is another important fact which has issued from the present War; events of the world-wide conflict now raging cannot be properly appreciated without an understanding of the developments in this field. This also is a matter to which attention will be devoted by the editors.

It is further hoped to continue, as far as it is possible, to place at the disposal of the readers of the *Revue* the experiences gained in the present War by those serving with the armies of the present belligerent groups.

Lastly, the editors intend to publish in the pages of the *Revue* information concerning the events of the War and to offer criticisms thereon, when necessary, in order that the lessons to be deduced from the operations may be placed clearly before the readers of the *Revue*.

It is proposed, more particularly for the benefit of junior officers, to issue a *Historical Supplement* in parts; the first part will be published with the number for February next. The Military Society of the Canton of Geneva will take part in the publication of this *Supplement* and bear a share of the cost of production. This *Supplement* will deal with problems connected with the mobilization and manning of the Swiss frontiers during the Franco-German War of 1870–71; it was written by the late Colonel Galiffe and is based on official records.

THE PART PLAYED BY THE FRENCH-SWISS IN THE MILITARY HISTORY OF SWITZERLAND.

The Heroic Epoch: From the Battle of St. Jacques to the Burgundian Wars.

The writer of the *Revue* article points out that the French-Swiss have played a relatively important, but little known, part during the early years of the foundation of the Swiss Confederation in its military institutions and have thereby contributed their share to its development.

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Although many *Welches*, *i.e.*, French-Swiss, believe that to the German-Swiss alone is due the whole of the glory attaching to the successes of the Swiss Armies in the period prior to the 19th century, yet the fact remains that since the 15th century the contingents formed for the Swiss Army by the French-Swiss have exceeded in numbers those formed by the German-Swiss. The *Welches* can truly claim to have contributed their share to the sacrifices on the field of battle by which Swiss unity has been won. The idea that the " Romand " legions of the Helvetic Republic were the last to become Swiss is founded on an error; it has been overlooked by those not familiar with Swiss history that although the " Romand " legions only joined the Confederation as *Cantons* in the 19th century, yet they had been Swiss for many centuries earlier.

Thus the year 1803, for example, marks but a stage in the historical development of the Pays du Vaud; it must not be assumed that, prior to the year named, the people of the Vaud were looked upon as foreigners in the eyes of the Swiss. Nor can it be assumed that the Canton of Ticino suddenly came into existence from nothing. The bailiwicks of the Leventine, of Bellinzona, of Val Maggia, of Locarno, of Lugano had already been successively taken by the Swiss from the Dukes of Milan at various dates since the end of the 14th century and had for a long time prior to 1803 formed a part of the Helvetic Group. Finally, in the year last named, this region took its place in the Confederation as a *Canton* with sovereign rights.

The Valais, Neuchatel and Geneva, in which an ancient friendship for and a long-established alliance with the Cantons had existed, owing to a community of secular interests and to unity of sentiments, had since 1307, 1406 and 1519 respectively participated in the good fortunes and the bad of their allies. The year 1815 represents to them the date on which they merely put on a permanent footing a condition of affairs of old standing by renewing a pact of old date on a basis more irrevocable than formerly had been the case: it was with them not a case of entering into partnership with a new and unfamiliar State.

The author of the *Revue* article relates briefly the incident connected with the march, in August, 1444, of an infantry detachment belonging to Neuchatel, under Albert Tissot, to the banks of the Birse where it arrived on the scene in time to take part in the Battle of St. Jacques on the 26th August, 1444.

The early " Romand " friends of the Helvetic League are next passed in review and a brief account is given of the military assistance that they afforded to the Confederate troops. We are also told that the first of the Italian regions to join the Helvetic League were the Leventine, Bellinzona and Domo D'Ossola.

The bonds which tied the sparsely-populated regions of the Jura bordering the Lake of Geneva and of the head waters of the Ticino to the Swiss were indeed slight and ill-defined, except when it became a question of military aid. The *Helvetie Romande* for a long time played a subordinate or intermittent *rôle* by the side of the Cantons possessing sovereign rights. The *Welches*, however, were fully inspired with the hope of founding the new *liberté suisse*.

The towns and the *seigneurs* of the *Pays romand* wisely placed them-

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selves under the protection of republics which were sufficiently strong to cause the most powerful monarchs in Europe to treat them with respect. Being thus allied to or subjects of important leagues, whilst only under slight obligations to them, nevertheless they were able with impunity to defy the Empire, the King of France and the House of Savoy, whenever the authority of the princes became irksome. The Communes, with their spirit of independence, and the nobles, with their egotistical particularism, were both able to turn the situation to their advantage.

The Burgundian Wars were the prelude to the definite conquest of the Pays du Vaud by the Swiss. The sons of the *Helvetie romande* were at this time found in both camps and were being kicked on all sides. During the four years of war, 1474—1477, the Swiss, faithful to their belief in the offensive, threw their armies into the neighbouring countries from the plains of Alsace to the shores of the Lake of Geneva, in Savoy and in Franche-Comté, their blows followed in rapid succession until the *coup de grâce* was given to Nancy, a *coup* which humbled the most powerful prince of this epoch. Numerous contingents from Latin Switzerland took part in this struggle under the banners of the Cantons or of their allies. It is estimated that 8,000 out of the 60,000 men fighting under the Confederate banner against the Burgundians belonged to the contingents from Latin Switzerland.

France obtained the greater share of the profit from the Burgundian Wars. Louis XI., who was responsible for starting this conflict, by drawing the Swiss into it, was able to hold forces in reserve in his own hands until the power of Charles the Bold was broken. Having got rid of his powerful enemy, he plucked away, without having himself drawn the sword, the fruits of victory from the Confederates; the Duchy of Burgundy was annexed to the French Crown. The astute Louis XI. succeeded in preventing Franche-Comté from joining the Helvetic Confederation, as it desired to do.

The Swiss only gained a few towns and *seigneuries* in Savoy by this war, but they won military renown which gave them a great reputation throughout Europe. The Peace of Friburg, which ended the war, left the *Helvetie Romande* maimed and divided against itself. The people of the Vaud were, however, quickly reconciled. When peace was signed, in 1477, Aigle and Vaudois Chablais refused to rejoin Savoy and demanded to be allowed to remain Bernese. The fact is that the House of Savoy had lost its prestige owing to the incapacity exhibited by its failure to defend the country on which it had brought the calamity of a war.

Since the Treaty of Friburg the sons of the *Suisse romande* have continued, century by century, to grow more numerous than those of the *Suisse alémanique*.

THE ITALIAN WARS.

The Suisse Romande at Marignan. Conquest of the Pays de Vaud.

During the 60 years which elapsed between the Burgundian Wars and the definite and complete conquest of the Pays du Vaud by the Bernese, the *Helvetie romande* was more and more drawn, by the Swiss, into the

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incessant wars in which the Confederation became involved with its neighbours.

The Cantons, then at the zenith of their power, proud of their strength, arbiters of the fate of nations, allies of the King of France, of the King of Hungary, of the Dukes of Milan, of Savoy and of Wurtemburg, Protectors of the Holy See, possessed an army which was remarkably well organized and disciplined, considering the times. Compulsory military service gave them the advantage of enabling them to put 80,000 infantry of the best in Europe, into the fighting line. In the interval between two national wars, after having defeated the Duke of Burgundy, the Emperor of Germany and the Duke of Milan, since peace had become an expensive luxury to a people in arms, the Cantons sent their soldiers forth to fight the battles of foreigners.

The *Welches* contingents followed, with others, the fortunes of Charles VIII. of France at the Conquest of Naples (1494) ; the men of Leventine, an Italian speaking people, fought stubbornly against the Italians at Giornico. Then came the terrible and cruel Suabian War, which shattered, in 1499, the last links binding the Swiss Leagues to the Empire.

The Italian Wars of 1500 to 1515 followed ; at first against France, and then against France and the Papal Power. Summer and winter, the passes of the Alps were choked with troops on the march towards the south, towards the Promised Land. The *Welches*, whether allies or subjects of the Cantons, did not fail to respond to the call to arms. The conquest of the present Canton of Ticino took place at this period, followed by that of the whole of Lombardy. Among the indomitable bands which brought about the fall, within six weeks, of all the Milanese fortresses were to be found the men of Neuchatel, of the Juras, of the Valais, of Friburg and of Vaud. They marched under the orders of Baron Ulrich, of Hohensax, the first Swiss General to be nominated to a Command by the Diet ; they entered Milan with him, on the 29th December, 1512, in company with the pikemen of the ancient Cantons. The following year they appeared, at Novara, fighting under the banner of the White Cross ; prodigies of valour were witnessed at this battle, a brilliant victory followed, the French being chased for a second time out of Italy. Two months later, some hundreds of French-Swiss formed a part of the 35,000 Confederates who besieged Dijon. The final trial of strength took place at Marignan. On the 13th September, 1515, 30,000 Swiss volunteers of Cardinal Schinner's contingent were drawn up in battle array on the plain of Zivido. These volunteers, since nicknamed the "*enfants perdus*," formed the advance guard of the force which fought at Marignan. They marched at a rapid pace against the enemy who were unable to resist the pressure brought against them, the enemy's cavalry was pushed back and dispersed. Two hundred pikemen who came to the assistance of this cavalry were annihilated by the "*enfants perdus*." Intoxicated by their success, in spite of the fire of 300 guns, culverines and wall pieces, the Volunteers were soon over the ditches of the parapets held by the enemy and after a violent struggle got well into their ranks, seizing many colours and seven or eight guns. The

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white plumes of the "*enfants perdus*" now crowned the enemy's parapets. This was the modest but glorious *rôle*, says the author of the *Revue* article, that the Latin-Swiss played on the first day of Marignan. This was the prologue.

Next followed the attack of the three corps belonging to the Cantons, among them and in the centre, with those belonging to the Waldstætten, marched the contingents furnished by the ancestors of the present dwellers in the Canton of Ticino; there were present also those from the Leventine, from the Val Maggia, from Bellinzona and from Locarno.

On the following day the Volunteers, reduced to half their original strength, continued the fight, but this time what remained of the advance guard was driven back on the main body.

This battle of giants marks the end of the heroic period in Swiss history, which had commenced, in 1315, at Morgarten. The European *rôle* of Switzerland as a Power ended there.

The retreat from Marignan left an indelible mark on the memories of the Swiss people; beaten they may have been, but they remained so formidable a foe that the enemy did not dare to enter on a pursuit. The retreat is numbered amongst the memorable ones in the chronicles of war. Of the 16,000 Swiss, who gave ground, step by step, under the eyes of the King of France along the road from Milan, not a prisoner, not a colour, not a gun fell into the enemy's hands, but no less than 14,000 were left as corpses on the battle ground.

In 1536, the Bernese troops completed the conquest of the Pays du Vaud, begun at the period of the Burgundian Wars. These troops, who were commanded by General Hans Franz Naegeli, put an Italian corps to flight at Morges, relieved Geneva, seized the regions of Gex and of the Chablais; at the same time, in the East the troops from Valais advanced up to Evian. The Lake of Geneva became wholly Swiss, but it only remained so for a short time; its southern bank was lost 30 years later owing to the feeble diplomacy of the Cantons.

With the assistance of the Genevan Contingent the Bernese troops besieged the Château de Chillon, the last fortress of Savoy. Yverdon was the only town which resisted for any time. Finally the whole of the Pays du Vaud was incorporated into the *Corps helvétique*, but as a subject territory. Military spirit developed rapidly in the Vaud, and this region provided valuable contingents to the National Militia.

The Romands in the Service of Foreigners.

From the middle of the 16th century, the *Corps helvétique* divided and weakened by religious conflicts, without any foreign politics, bound to France by the Treaty of Alliance of 1521, lost its position of eminence; its republican institutions and its warlike traditions alone survived. Kings and princes now took advantage of the passion for arms and the adventurous spirit of the Swiss. The taking up of military service in foreign lands became a characteristic of the Swiss and increased with time; the Cantons even encouraged foreign enlistments. The soldiers from the *Suisse romande* acquired a great reputation owing to their

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élan, courage and good humour ; they displayed military qualities which made them, in every way, the equals of their *Confédéres alémaniques*.

The author of the *Revue* article gives many details of the actions in foreign lands in which Swiss troops have been engaged since the beginning of the 16th century. He tells us that the *Pays romand* gave many brilliant officers to the foreign armies ; 160 of them were promoted to the rank of General for meritorious service in the field. The names of a large number of those who thus gained distinction are mentioned in the *Revue* article.

The *Welches* having fought, elbow to elbow, with the *Suisses alémaniques* during three centuries became infected with the solid military qualities of the latter, their reasoned courage, their tenacity, their spirit of discipline, their devotion to duty. In return they passed on to their *Confédéres* some of their enthusiasm, of their alertness, of their bravery amounting even to the rashness inborn in the *Romand*. The two races, being to some extent complementary, formed an excellent combination and produced a highly-developed type of soldier who was neither French, nor Teuton, nor Latin, nor German, but the Swiss soldier.

Mesopotamia and Dardanelles.

The article under the above heading commenced in the November number of the *Revue* (*vide R.E. Journal* for February, 1917) is concluded in the number under review. This instalment of the article is also illustrated with sketch-maps.

If the Government of India, says the author of the *Revue* article, is responsible for the check in Mesopotamia, nevertheless, it is the British Government itself that must bear the direct responsibility for the check at the Dardanelles.

On the Continent, the British have been credited with being a cool and methodical people who leave nothing to chance. The manner in which the Dardanelles Campaign was entered upon and directed has destroyed this reputation. As for the advance on Bagdad, it is suggested that the end in view so dazzled the authorities that British troops were set in motion before the preparations for an advance were completed.

Those who are familiar with the geographical and military situation in the Dardanelles are fully aware that two methods of forcing the passage into the Sea of Marmora were open, namely, (a) by surprise, or (b) by combined sea and shore operations.

It is, says the author of the *Revue* article, difficult to fathom the intentions of the originators of the enterprise, which probably were not really clearly thought out by them in the first instance. What is known is that there was neither any attempt at surprise, nor was there a sufficient force employed.

There has been much discussion on the question as to whether a surprise *coup* would or would not have had a chance of meeting with success. Many competent to express an opinion on the subject have come to a conclusion in the negative. They may be right, but it would seem that at the time Turkey began actively to participate in military operations,

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i.e., at the end of October, 1914, the defences of the Dardanelles were by no means in a very efficient condition. The communications between Turkey and Germany were precarious and no very great reinforcements in men and material were available in the latter country for employment in the Ottoman Empire. It is suggested that, in view of this situation, had a powerful squadron from the British Navy, supported by a strong landing force, made its appearance on the morrow of the declaration of war by Germany in the Dardanelles it is highly probable that it would have met with a large measure of success.

Instead of adopting this course, a futile bombardment was indulged in on the 3rd November, 1914, and then a period of inactivity followed which lasted more than three months. The reason for this inactivity, it is said, is clear. At this time both Great Britain and France wanted every man they could put in the field of operations in Flanders in order to stem the tide of the German rush on Calais.

British statesmen, the author of the *Revue* article tells us, are much wanting in knowledge of military matters, but they must be aware, he says, of the fiasco, which occurred in 1807, with which the name of Admiral Duckworth is associated. An abridged account of this incident, borrowed from the *Histoire du Consulat et de l'Empire* (Vol. XXVII.) by Thiers, appears in the *Revue*.

The following gives an outline of the incident in question. At the beginning of 1807 the relations between Great Britain and Turkey were on a footing similar to that in existence in the autumn of 1914, but it was France and not Germany that was, at the date in question, behind the Ottoman throne. At the instance of General Sébastian, the French Ambassador, the Porte had returned his passports to the Russian Ambassador, Russia being at that time a British ally, but the Turks hesitated to break with Great Britain. The British Ambassador demanded from the Turks the reinstatement of his Russian colleague and the expulsion of the French Ambassador. He also made it known that if his demands were not at once accepted, he would withdraw from the Golden Horn and embark on a British man-of-war; a British fleet was at this time assembled at Tenedos.

The action of the British Ambassador naturally created consternation. The fortifications guarding the Dardanelles passage had been for long neglected to a great extent and no reliance was placed on them, so that the Turks felt that the British fleet could, if it so wished, sail into the Sea of Marmora. However, in General Sébastian, the French had a very clever diplomat as well as a good soldier. He used the name of Napoleon for all that it was worth; he recounted the great Corsican's victories to the Turks, told them of his presence on the Vistula, and impressed them with the advantages that they would derive from an alliance with France. The Porte was won over and refused to accede to the British demands.

In consequence, on the 29th January, 1807, the British Ambassador quitted Constantinople and proceeded to Tenedos. The winds were not, at this date, favourable for the passage by the British fleet of the Straits from the south. But on the 19th February, Duckworth forced

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the straits, with seven ships of the line, two frigates and many corvets, in spite of the Turkish fire. He disposed of a small Turkish squadron which attempted to dispute his progress at Cape Nagara, by sinking all the Turkish boats and without suffering any serious loss himself. Two days later Duckworth put in an appearance before Constantinople. However, Sébastian had put courage into the hearts of the Sultan Selim and of his ministers—they had been quite ready to surrender Constantinople to the British squadron—and advised them to resist the British demands with a view to gaining time.

There happened at this time to be some French Artillery and Engineer officers at Constantinople. Under their directions formidable batteries, armed with 300 guns, sprang up as if by the wave of the magician's wand. In the meantime, the Turkish diplomats, past masters as they were in the art of prolonging negotiations, continued to bargain with the British admiral: and by the time he realized that the Turks were playing with him much valuable time had been lost. When it was too late Duckworth discovered that he had let his opportunity slip; it was only when he saw the great number of guns trained on his ships that he realized that he had been "bluffed." At the same time, he learnt that a considerable number of guns had been mounted in the works along the Straits whilst he had been negotiating with the wily Turk. Had he now attacked Constantinople he would, says Thiers, have been guilty of an act of useless barbarism; after the bombardment he could only have run south with his squadron, in order to get through the Straits into the Mediterranean. Owing to the strengthening of the defences along this passage it was most desirable that there should be no lame ducks with this British squadron and therefore the admiral could not run the risk of his ships being crippled in an engagement at the Golden Horn. After spending eleven days in the Sea of Marmora Duckworth, on the 2nd March, 1807, weighed anchor and ran along the walls of Constantinople with decks cleared for action. Finding that this did not intimidate the Turks, who were ready to defend themselves, he sailed south and dropped anchor on arriving at the Sea of Marmora outlet into the Straits. On the following day, the wind being favourable, Duckworth again forced the Dardanelles passage in an outward direction. He succeeded in his project without the loss of a ship and with only 200 casualties. He returned to Tenedos and again cast anchor there.

Such was, says Thiers, the end of this enterprise which the insufficiency of means employed and the scruples of humanity brought to an unsuccessful termination. Disappointment was keen in Great Britain in consequence of Duckworth's failure; Napoleon, on the other hand, was extremely elated. Nothing that occurred in 1914 lends countenance to the idea that Marshal Liman von Sanders and Enver Pacha would have allowed themselves to be more easily intimidated than did General Sébastian and the Sultan Selim in 1807. Therefore nothing would have been gained in the winter of 1914 by merely forcing the Dardanelles passage had the combined British and French fleets not been accompanied by a landing force.

It would be idle, says the author of the *Revue* article, to enter upon a

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discussion of the question whether, on the 3rd November, 1914, the Strait could or could not have been forced.

It was, he points out, probably not chance that brought the allied fleets to the Dardanelles on the 19th February, 1915, on the anniversary of Duckworth's success, with the object of renewing the attack. The date may have been chosen purposely, it is suggested, in order to enhance the *morale* of the allied sailors by the deeds of 108 years ago, and to create despondency in the enemy ranks.

Why the allied fleets were not accompanied by a landing force is a question which must be left for history to answer.

The operations of the allied fleets and also those in connection with the landing of the divisions of the British Expeditionary Force are touched upon in the *Revue* article.

For five weeks the allied fleets continued to pound away at the Turkish defences, defences which, during the six months since the declaration of war, the Turks had been able to strengthen and to put into good order. No progress was possible in the absence of land operations. It was not till the 25th April, 1915, that the British and French Expeditionary Forces were brought on to the scene of operations. The British Expeditionary Force consisted of a Regular Division, a Territorial Division, a Naval Division, the Australasian Corps, and some Indian troops making a total of 100,000 men, whilst the French Expeditionary Force numbered 35,000 men.

The combined British and French contingents provided quite a respectable force with which to commence operations, having regard to the restricted area which the Gallipoli Peninsula afforded for the manœuvres of an invading army. However, in view of the strength of the Turkish positions and the facilities which existed for providing reinforcements to the Turks, the allied force cannot be considered to have been sufficiently large to defeat the Turkish force in the Peninsula and to carry out further operations against the Turkish Army should it have been possible to drive the Turks out of their positions in Gallipoli. The difficulties experienced in connection with the landing at the southern extremity of the Peninsula gave a foretaste of what was in store for the invaders. The Turks put up a stubborn resistance and between the 25th April and 5th May, 1915, the British casualties amounted to 14,000 men.

On the 5th May the British attacked along the whole of their front, but without meeting with any appreciable success. The months of May, June and July were spent in fruitless attacks and counter-attacks. By the 18th July, the British casualties amounted to 50,000, yet no military advantage was gained to compensate for this heavy loss. The Anzac Corps remained separated from the main army and was in a somewhat critical position.

On the 7th August, the British received reinforcements at Suvla Bay; the Turks estimated the strength of these reinforcements at 70,000 men. Another attack was now made by the British on the front Sari Bair-Anfarta, but met with no greater success than those which had preceded it. The Turks claim that the British loss on this occasion amounted to 30,000.

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The campaign now degenerated into trench warfare, which was costly if undecisive. The entry of the Bulgarians into the fray, and the invasion of Serbia by Austro-German troops helped to clear up the situation in the Balkan Theatre.

On the 20th December, the troops which had been landed at Suvla Bay and the Anzacs were withdrawn from Gallipoli. An impression was created that it was intended to hold on to Seddul Bahr, but in the beginning of January, 1916, this point was also abandoned and all that remained of the allied effort against the Turks in the Peninsula were vast cemeteries containing the remains of their dead.

As Napoleon had done, so also did Enver Pacha experience considerable elation at the defeat of the British. On the 10th January, 1916, the latter addressed the Ottoman Parliament; extracts are given from Enver's speech on this occasion. He is reported to have said that he had been confident that Turkey's enemies would be successful neither in their land operations nor in those conducted by them on the sea. Events had proved the correctness of his anticipations. He further stated that the Turkish Army had been successful in gradually drawing against itself a force of 500,000 Anglo-French troops, and he thanked the British sincerely for having given the Turks such a splendid opportunity for helping their Allies.

The author of the *Revue* article is of opinion that Enver Pacha was boasting a little too loudly in claiming that the Turks had drawn an allied force of half a million men to Gallipoli: he is of opinion that the Anglo-French force must, however, have exceeded a quarter of a million men. The British casualties have been admitted to be 120,000 men, the French casualties were much lower: the total loss of the Allies in this theatre is put at 200,000 men, who are said to have been "sacrificed" without the attainment of any positive advantage.

German officers have stated that at one time the Turks were short of ammunition and Enver has confirmed this. Had an energetic attack been made at the opportune moment it is quite probable that the Turkish front would have been broken. Perhaps the moral effect of such a victory might have resulted in a revolution in Turkey, and a reaction in favour of the Entente Powers, but such an eventuality was so remote that grave risks were involved in basing a plan of campaign thereon.

What France has done for her Allies.

In a footnote the editors of the *Revue* point out that in a war waged by a coalition, unity in direction involves a continual exchange of resources between the Allies. Each must yield up what is a surplus and receive what is necessary to supply its deficiencies. The study of questions affecting such exchanges is as useful as that of the study of the war itself.

A few weeks after the declaration of war France was deprived of one of the most populated and richest regions of her territory: the *attaque brusquée* of the Germans through Belgium led to the loss of the greater part of the French resources in coal, iron, and steel, and at the same time

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gave the Germans control of many valuable industrial enterprises in the northern and north-eastern districts of France.

The extent of what it is that France lost may, to some extent, be gathered from the following table :—

49	per	cent.	of	her	resources in coal.
80	,,	,,	,,	,,	coke.
90	,,	,,	,,	,,	iron ore.
80	,,	,,	,,	,,	iron.
80	,,	,,	,,	,,	steel.
80	per	cent.	of	her	metallurgical industries.

Out of 112,000 workmen employed in the metallurgical industries, she lost 60,000.

The task has had to be faced in France of reconstituting, in the first place, the means of production in articles of primary importance, in order that allied countries should be as little inconvenienced as possible by having to meet her heavy demands for necessities, and in the second place, of converting the factories remaining in her possession into munition works and of providing additional workshops. Marvellous enterprise and energy have been shown by the French leaders and people, so that in a short time France has been able not only to meet all her own requirements, but has even come to the assistance of the armies of her Allies. The following brief *résumé* gives an outline of what she has achieved :—

Russia.—French assistance has been directed to two ends :—(1) The supply of the war material in which Russia was deficient ; (2) the increase of the output of Russian factories by the provision of a Consulting Staff of technicians and specialists.

I. Among other war *matériel* the following have been supplied to Russia by France :—Rifles 600,000 ; rifle ammunition 300,000,000 rounds ; large quantities of machine guns and automatic pistols ; many millions of hand grenades ; millions of rounds of fixed ammunition for field guns ; over 100 90 mm. guns, more than 100 tubes for the Russian 3-in. guns ; many hundreds of heavy guns and mortars ; hundreds of aeroplanes, and thousands of motors for same ; 1,600 motor wagons, and 100 motor buses. The monthly consignments of war material from France to Russia has equalled in weight nearly 16,000 tons and has exceeded 706,000 cubic ft. in measurement.

II. The French Government have also sent patterns and specifications in large quantities to Russia, in order to enable artillery, rifles, etc., to be manufactured in the Russian workshops. Russian engineers have also been given special facilities to visit workshops in France and to acquaint themselves with the processes which they have wished to study. Several missions of French engineers and contractors have visited Russia, the most important of them being the one which was sent under the direction of Lieut.-Colonel Pyot in connection with the manufacture in Russia of projectiles and explosives.

Italy.—The assistance given by France to Italy has been in relation

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principally to the supply of essential products, armaments and transport.

I. Italy as is well known, has no coal mines. In ordinary times she looked to Great Britain for the coal required for her factories and railways. Maritime freights, however, have increased so enormously that France has had to help Italy out by supplying her with coal. France has also supplied Italy with special grades of steel. A mission of French specialists has visited Italy in order to start the manufacture of these special grades of steel in that country.

II. In addition to ammunition for heavy artillery France has furnished large quantities of ammunition for the " 75 " field pieces ; more than 100 mortars ; more than 600,000 hand grenades ; more than 500,000 helmets ; 40,000 sap shields ; hundreds of tons of aluminium and chemicals ; large quantities of aeroplanes and parts for same.

III. France has also helped the Italian railways by lending trucks, etc.

Serbia.—The main directions in which France has helped Serbia is in the matter of transport and the reconstitution of her army.

From the end of 1914 up to the evacuation of Serbian territory France furnished 2,000 rounds daily for the Serbian " 75 " guns.

When the Serbian Army arrived on the Albanian coast, it was France that provided the transports to carry the remnants of this army, consisting of 150,000 men and 10,000 animals, to Corfu ; the transfer was carried out, in January, 1916, in perfect order and without the loss of a man, in spite of the presence of hostile submarines.

It was the French medical mission that provided for the welfare of the Serbian sick and wounded during the retreat of the Serbian Army through Albania and looked after them in the temporary hospitals formed at Corfu.

Further the French Government has sent a military mission, which was at first under General Mondesir and later under Colonel Douchy, to assist the Serbian General Staff in reorganizing the Serbian Army. Both France and Great Britain have provided the necessary equipment, stores, etc., to enable the Serbs to take the field again. At the end of June, 1916, that is six months after its arrival in Corfu, the Serbian Army had been transported to and assembled in Chalcidice fit and ready to take the field again. Some idea of the magnitude of these transport operations may be gathered from the following data:— 150,000 men, 40,000 horses and 5,500 vehicles of all sorts and some 5,000 tons of stores were transported from Corfu, Bizerta, and the ports of France to Salonika, involving 76 journeys on the part of the flotilla employed ; this flotilla consisted of 150 transports and war vessels.

France provided, in the space of a few months, the Serbian Army with 100,000 rifles, hundreds of machine guns, field guns, heavy artillery, 4,289 military vehicles, field hospitals totalling 7,000 beds, immense quantities of telegraph and telephone materials. Finally, the Serbian aviation service has been entirely equipped with the products of the workshops of France.

Roumania.—France has supplied the Roumanian Army with practically the whole of the war material and munitions required by it. A

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French military mission has also visited Roumania for the purpose of furnishing advice on matters connected with the conduct of a modern war.

I. France has furnished Roumania with, *inter alia*, a first instalment of more than 100,000 rifles, 80 million rounds of ammunition for the same; a further consignment of 10,000 rifles per month; more than 1,000 machine guns and also ammunition for same; more than a million hand grenades; technical stores for the telegraph and telephone services, etc.; motor vehicles; 200,000 helmets; 500,000 gas helmets, etc.

France has also supplied Roumania with immense quantities of raw materials necessary to enable her to carry on her manufactures; of these the principal items have been 100 tons of brass, 500 tons of tolite, 150 tons of black gunpowder, 2,300 tons of other explosive powders, 200 tons of dynamite, 100 tons of tool steel, 500 tons of special steel per mensem for the manufacture of projectiles.

The Roumanian aviation service has also been entirely equipped by France.

II. The supply of the above stores involved the transport of 5,000 tons of stores, etc., during the months of September and October, 1916, and has been carried out in French ships. The demands on the French shipping have since the dates mentioned been increasing month by month.

III. A military mission under General Berthelot has visited Roumania to assist the Roumanian General Staff; further, the technical missions sent to Russia have also been placed at the disposal of Roumania.

In order to give a bird's-eye view of the extent of the assistance France has given her Allies since the beginning of hostilities to the 1st November, 1916, a table is given in the *Revue* article showing the proportion of the output of her workshops which has been consigned to the Allied Armies; the figures may be of interest and are given below:—

30	per cent.	of rifles manufactured, 1907—1915.
22	,,	small arms ammunition.
20	,,	projectiles for field guns.
20	,,	projectiles for heavy guns.
13	,,	trench mortars.
27½	,,	hand grenades.
10	,,	gas helmets.
8	,,	powder.
5	,,	explosives.

In view of the extent of the disorganization effected in France by the German invasion, the foregoing information furnishes some indication of the marvellous power of organization and recuperation possessed by the French people. On every front of battle there exists to-day evidences of what French genius is capable of.

A FEW WORDS ON ACTIVE SERVICE IN SWITZERLAND.

At the time that the December number of the *Revue* was going to Press the Swiss troops of the *Élite* were about to be mobilized for the fourth time since the outbreak of the War; in less than two years,

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these troops have completed three periods of service totalling 13 months in all.

The author of the *Revue* article states that each new call to the Colours has, owing to the prolongation of the hostilities, added to the cares and anxieties of Swiss soldiers, in view of the seriousness of the economic situation. In consequence, the men's commanding officers find it increasingly difficult to maintain the *morale* of their units at a high level. It is suggested that the best way of keeping up the spirits of the men is to let every man, particularly those belonging to the infantry, take an active part in what is in the nature of police duties on the frontier. The sound of the distant roar of artillery, the patrolling of the frontier, often under trying conditions, are an excellent tonic for the soldier's nerves and help to build up in him the right feeling with regard to duty, discipline, obedience, self-abnegation, and also bring before him in the most impressive manner, better than the best lectures on theory, what are the necessities of the moment.

Notes and News.

Switzerland.—A special correspondent contributes an article dealing with matters concerning the Swiss Army. He informs us that the Swiss Commander-in-Chief issued a circular on the 5th October last dealing with the application of the regulations contained in the Swiss Infantry Training Manual. In this circular it is stated that the lessons of the present War are not yet sufficiently definite to justify the introduction of new methods in attack. The only point which stands out prominently, it is said, is the fact that in modern battles technical appliances play a very considerable *rôle*, and what is of prime importance is the true value of each individual who forms part of an army. Therefore the chief duty of the officers is to develop and strengthen the individual character of those under their command.

The circular further points out that whereas in former times drill was the most important means of training the soldier for the battlefield, it is not so efficacious for this purpose in the case of the present-day trench warfare. The contributor of the article under review takes up the question of whether drill is the best means for obtaining and maintaining discipline. His conclusion is that perhaps an exaggerated value was formerly attached to drill; on the other hand, there is a tendency nowadays to go to the other extreme.

It is stated that the Press Bureau has recently inundated the newspapers with communiqués on a great variety of subjects. Apparently the character of the information contained in these communiqués does not entirely satisfy those responsible for the conduct of journalistic enterprises. A suggestion has been put forward by the *Semaine littéraire* that a tour should be organized so as to enable journalists to spend a short time on the battle fronts in the belligerent countries in order that contact may be re-established between the public and soldiers and so that the Press may have an opportunity to inform itself on matters, knowledge of which is essential to its existence.

The Swiss Army has been provided with a new head dress. When the new uniform was introduced in Switzerland in 1914, the question of replacing the kepi by some other form of head dress was left over for

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further consideration. It has now been decided to give the Swiss soldier a helmet; the one selected is said to be light, strong, cheap and becoming.

The death is announced of Colonel Turrettini, of the Swiss Artillery, at Geneva.

Belgium.—A special correspondent contributes an article relating to various matters connected with the War. He points out that, in spite of the difficulties of the situation, the Belgian Government has managed to frame, pass and promulgate a new law relating to military service. In former times some three to five years would have been spent on such a measure in Parliament, but to-day, without any discussion or vote, the Belgian Cabinet have, on their own responsibility, done what was necessary and have received the full support of public opinion. By the new law military service is obligatory for all Belgians between 18 and 40 years of age inclusive. Men liable for military service are divided into seven groups, namely:—

1st Group:—Bachelors between 18 and 30 years of age. Married men between 18 and 22 years of age.
2nd Group:—Bachelors between 30 and 35 years of age.
3rd Group:—Bachelors between 35 and 40 years of age.
4th Group:—Married men between 22 and 30 years of age.
5th Group:—Married men between 30 and 35 years of age.
6th Group:—Married men between 35 and 40 years of age.
7th Group:—Exceptional cases.

The first two groups have already been called up for service. The remaining groups will be incorporated successively according to the necessities of the situation.

It is said that Belgians from all corners of the world are rallying to their country's call. In spite of the precautionary measures adopted by Germany, in the occupied parts of Belgium, many men succeed in making their way out of these regions and in joining their compatriots fighting on the Yser.

The question of keeping up a sufficient supply of officers and N.C.O.'s for the Belgian Army has been a matter of constant care with the General Staff. The wastage in the commissioned and non-commissioned ranks has been exceedingly heavy; particularly was it so in the early days of the War.

Schools of instruction for subaltern officers of infantry, cavalry and artillery have been established at various centres. The period of instruction for infantry officers which was two months at the beginning of 1915 has now been raised to four months.

Much has been done to improve the equipment of the Belgian Army. The artillery has been practically rearmed.

In her adversity Belgium asks for no tearful sympathy; her sons are determined to avenge the wrongs done to their country. What Belgians most desire is that their motherland shall emerge from her present misfortunes with honour and glory and that Belgium may in the future rise as a strong Power capable of securing respect for her sovereign rights by force of arms.

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United States of America.—A special correspondent writes that the mobilization which was ordered in the United States of America on the 18th June, 1916, did not come as a surprise. From the time that Villa's insurgent bands entered the territory of the United States a large part of the American regular troops from the New York District have been sent to the Mexican frontier.

Owing to the heavy demands made on the Regular Army for units for service in the Colonies those remaining available for defence of the southern frontier of the United States are not in a position to provide the full numbers required for the purpose; consequently a call had to be made on the National Guard. President Wilson's policy, it is said, has been characterized by vacillation and the adoption of half measures; he decided at first only to call out the Militia of the three frontier States, Arizona, New Mexico and Texas. Not only was the Militia of these three States not in a fit condition to take the field, but many members sought to be excused service for family reasons. In connection with the mobilization of the 18th June last notices calling men to the Colours were served on about 96,000 men out of the total of 117,000 in the Mobile Militia. Many of the Militiamen were rejected by the medical officers for service in the field. Delay also resulted in mobilizing the units owing to the fact that the equipment was stored in the Federal Arsenals: these in many cases were at a considerable distance from the headquarters of units. Riding and draught horses had to be purchased in large quantities; the majority were untrained and were put into the hands of inexperienced men.

The American Press is said to have written a good deal on the subject of the transportation of the troops to the frontier. The complaints were sufficiently numerous to call forth official explanations on the part of the General Staff. It is said, among other things, that inadequate arrangements were made for feeding the troops whilst *en route*.

The troops of each State have been kept together whilst on the frontier; the contingent from New York consists of a complete division. The absence of well-qualified officers of the higher ranks has made itself felt. The General Staff have taken advantage of this mobilization to carry out manœuvre practices. The health of the troops has on the whole been good.

An outline is given of the new American law of the 3rd June, 1916, relating to military service. It provides for a peace establishment of 175,000 men—an increase of 55,000 men on the former peace establishment. These will be organized into 64 infantry regiments, 21 field artillery regiments, 25 cavalry regiments and 9 battalions of Engineers (two of them mounted). The additional numbers are to be raised gradually, within five years, by the addition of $\frac{1}{5}$ of the new units authorized under this law in each successive year.

The infantry regiments are to consist each of three battalions of four companies; cavalry regiments each of three groups of four squadrons; field artillery regiments each of either three or two groups of three batteries.

The contract of army service is to be for a term of seven years, three with the Colours, and four in the Reserve.

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The law of 3rd June, 1916, purports to affect an improvement in the Reserve, which in future is to consist of the men who are relegated to the Reserve after three years' Colour service and of old soldiers, under 45 years of age, entering into voluntary contracts of service for periods of four years. An *Enlisted Reserve Corps* is to be formed for the Engineers, Supply, Medical and Signal services. The reservists are to receive a retaining fee of £5 per annum.

Many clauses of the law relate to the recruiting and organization of officers. Entry into the service is to be by examination. Officers' Training Corps are to be formed in the universities and schools; those in the universities and affiliated colleges are to be known as the Senior Division; those in the "Military Academies" as the Junior Division. In the cases of certain institutions which have been subsidized by the Federal Government, the formation of Officers' Training Corps is made obligatory.

Another innovation is the introduction of *federal pay* for the National Guard in times of peace; the scale is fixed at 25 per cent. of the rates of pay adopted by the Central Government for the Regular Army. The officers of the National Guard will in future be required to pass an examination to be conducted by a Commission appointed by the War Minister; it is hoped thus to get rid of the system of appointment by election in vogue in certain States, a system which has proved inconvenient.

A reserve of the National Guard is to be formed, but the law does not enter into the details of its organization.

The minimum number of attendances required from the National Guard has been raised to 48 (of 1½ hours' duration each) per annum in place of 24. In addition each man will be required to spend 15 days annually at manœuvres or at a musketry school.

This number of the *Revue* concludes with a Bibliography.

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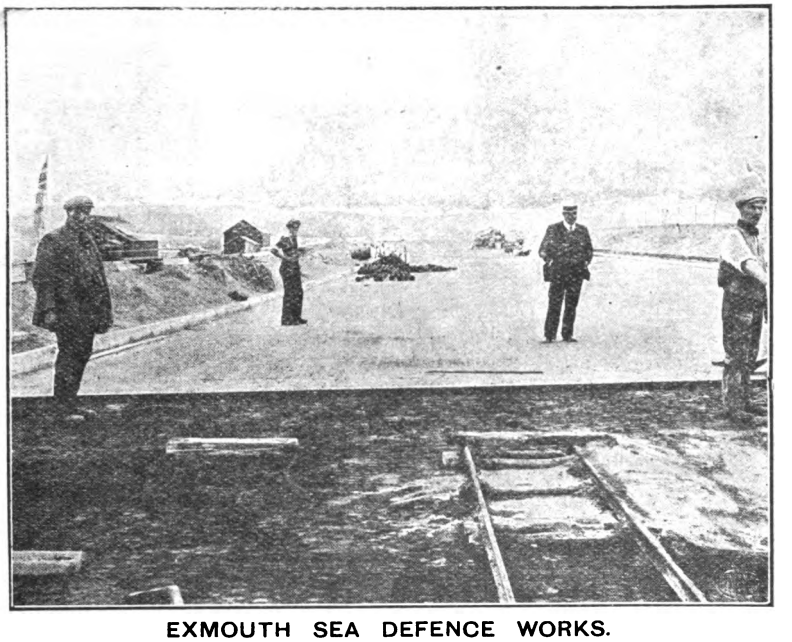

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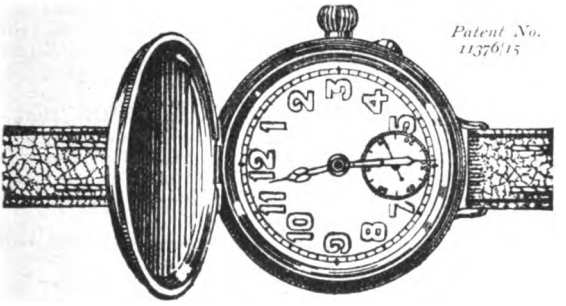

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*DEEDS OF THE ROYAL ENGINEERS.**

(Continued from the March number of the "R.E. Journal").

CHAPTER IV.

THE ROYAL SAPPERS AND MINERS IN THE CRIMEAN WAR.

THE war with Russia which broke out in 1854 consisted of three phases, the last and most famous of which was the invasion of the Crimea by the allied British, French and Turkish forces.

The cause of the war was briefly as follows :—

The European portion of the Turkish Empire had been in an unstable condition for many years; the growing strength and unruliness of the Balkan provinces fomented by dissatisfaction with Turkish rule caused Turkey to be designated "the sick man of Europe." Russia having a large seaboard on the Black Sea, the only outlet of which is through the Bosphorus and the Dardanelles, had long coveted this portion of Turkey and seized the opportunity by adopting a threatening attitude with a view to obtaining a religious protectorate over Turkey. The entrance of such a powerful nation into the Mediterranean was looked upon at that time as detrimental to British and French interests, but as both nations were then absorbed in domestic difficulties and internal politics, the Czar appears to have reckoned on their limiting their objection to diplomatic pressure. He therefore persisted in his pretensions by occupying with a belligerent army the Danubian principalities—now the kingdom of Roumania—with the result that Great Britain and France declared war and at once despatched expeditions to the Baltic and to the East.

To the Baltic fleet were attached, on the 9th March, 1 sergeant and 19 rank and file of the 2nd Company, Royal Sappers & Miners, under the command of Lieut. Nugent, of the Engineers. The object of sending the party with the fleet was, that it might lead the seamen and marines in any escalading operations ashore. No occasion, however, offered itself for resorting to such an expedient. Cholera broke out in the fleet and several of the detachment were seized with the malady.

It was then decided to attack the Aland Islands in the Gulf of Bothnia and a division of the French Army was despatched from

* Compiled in the R.E. Record Office.

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Calais to carry out this enterprise. The 2nd Company, Royal Sappers & Miners, 80 strong, under Capt. F. W. King, R.E., was detailed to accompany this force and sailed from Deptford on 15th July.

Before daylight on August 8th the Sappers, 600 of the Royal Marines and 2,000 French troops landed near Bomarsund. The leading troops consisted of Sappers carrying besides their carbines an assortment of billhooks, hand saws, and axes. The British operations were wholly carried out under the direction of Brig.-General Harry Jones, R.E., who had seen much service in the Peninsular War.

Nearly five days were employed in collecting tools, cutting roads, making preliminary reconnaissances, preparing a hospital, and making huts of branches of fir trees for sheltering the troops, while a strong party worked with unflagging zeal in making fascines and filling sand bags.

Meanwhile two or three attempts had been made by some officers of the Corps, attended by a few intrepid Sappers, to trace a battery for the purpose of reducing Fort Tzee which was strongly held by the enemy; but so heavy a fire was opened on them that these attempts were unsuccessful at first. Determination and a fine disregard for danger however got over the difficulty. No trace was used, but a simple alignment struck, from which on 13th August, under the cover of darkness, Serjt. John Jones and 24 rank and file, began to construct the battery under the orders of Capt. Ord. Without the chance of digging a shovelful of earth to give solidity and strength to the cover, the battery was built on the bare rock entirely of fascines and sand bags.

The Sappers erected the structure unassisted and practically completed it in 10 hours. Fort Tzee surrendered however at once so the direction of the battery was changed so that it bore on Fort Nottich. Speedily the epaulment which flanked the battery was prolonged, the platforms promptly laid and three 32-pounders having been placed in position, the embrasures were unmasked by some daring Sappers and the firing which lasted about nine hours ended in the surrender of the garrison. Two Sappers were allotted to each gun to keep the embrasures in good order and it was largely owing to their energy and courage that the guns were able to maintain their fire under the enemy's heavy bombardment. Lieut. the Hon. Cameron Wrottesley, R.E., was killed in this action.

When the French had captured Fort Tzee, Serjt. John Jones and Ptes. John S. Rowley and George Peters were told off to make a plan of it. The French however had abandoned the work which had been set on fire by the heavy Russian shell fire. Going through one of the embrasures, which was on fire and the gun

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carriage burning, the little party of three pushed on into the tower. Loose powder, broken cartridges and live shells were lying about; the flames had nearly reached the principal magazine, the remainder of the building was on fire in every casemate and the smoke was streaming from apertures everywhere. From floor to floor and embrasure to embrasure they moved but their efforts were unavailing; and being forced to return they had barely reached safety when the magazine exploded and the fort blew up.

Without attempting to chronicle the different incidents of the campaign it will here be sufficient to note that Bomarsund, the principal fort in the Aland Islands, capitulated without material opposition and the work of demolition was carried out entirely by the Sappers. Forts Prasto, Nottich, and Bomarsund were blown up in turn and Brig.-General Jones satisfied himself that the erstwhile formidable defences presented nothing but a scene of ruin and desolation.

Quitting the Baltic Sea the company rejoined the Corps at Woolwich on 16th October and, before two months had intervened, was despatched in all haste to Turkey.

We may now turn to the operations in Turkey. The van of the Army sent thither under the command of Lord Raglan was a small party of 6 rank and file of the Sappers & Miners under Capt. Chapman, of the Engineers. They belonged to the 4th Company, at Malta.

The Corps at this time had been increased to a total strength of 2,658 of all ranks and consisted of the following details :—

	Colr.-Sjts.	Sjts.	Cpls. & 2nd Cpls.	Bgls.	Ptes.	Total.
17 General Service Companies each	1	5	12	2	100	2,040
1 Company at Corfu	1	3	8	2	68	82
3 Survey Companies each	1	7	16	2	99	375
1 Survey Company..	1	5	12	2	100	120
Sydney Mint Detachment.. ..	—	1	4	—	11	16
Van Diemen's Land Detachment..	—	1	2	—	12	15
Staff.—1 Brigade Major, 1 Adjutant, 3 Quartermasters, 2 Sergeant-Majors, 2 Quartermaster-Sergeants, and 1 Bugle-Major						10
						2,658

To concentrate the force for active service the 7th Company was removed from Hurst Castle to Woolwich.

On the 24th February, 1854, the 11th Company, under Capt. Hassard, proceeded to Malta where they were joined on the 27th March by the 7th Company, Capt. Gibbs, who brought with them a further supply of tools and implements. Two days later

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both companies sailed with the Rifle Brigade for Gallipoli. A detachment of about 40 non-commissioned officers and men of the Corps was left at Gallipoli where they erected piers for landing stores, guns, etc., and prepared hospitals. The remainder marched to Boulair where they assisted to form the lines on the left of the position allotted to the British troops. When Sir George Brown, who commanded the division, took his departure for the frontier he published in orders of the 6th May, "his entire approbation of the general conduct, zeal and industry of the Royal Sappers & Miners on the works, both at Gallipoli and the camp at Boulair."

Two other companies were now reorganized to reinforce those in the East. These were the 10th, under Capt. Bent, to form the pontoon train, and the 8th from Gibraltar, under Capt. Bourchier.

To form a connection between the Sappers & Miners and the Army the four companies with the expedition were attached to the divisions as follows :—

1st Division.—11th Company, Capt. Hassard.
2nd Division.—8th Company, Capt. Bourchier.
3rd Division.—7th Company, Capt. Gibbs.
Light Division.—10th Company, Capt. Bent.

On the 27th May the 11th Company proceeded to Varna which for a few months was the principal frontier station and depôt for Engineer stores and pontoons, from whence parties were thrown out to Devno, Aladyn, Monister, Rustchuk, etc.

About 70 men of the 10th Company marched to Devno on 29th May where they worked very hard to render the place fit for the occupation of troops. The correspondent of *The Times*, in speaking of this work, termed the Sappers "a most utilitarian Corps," while Capt. Gordon in a letter to a brother officer remarked with respect to its general services "that the men work well and behave well. To be with them is a pleasure."

The 7th Company at Gallipoli and Boulair, in addition to their duties on the lines, constructed a number of log huts, stores, etc., for use in case the army had to fall back on the isthmus. On the 19th June the 8th Company joined the frontier companies.

Lance-Corpl. William Swann and Pte. Andrew Anderson accompanied Capt. Bent and Lieut. Burke to the beleagured fortress of Silistria and from thence to Rustchuk where a hazardous attack on the Russians holding the opposite bank of the Danube was undertaken by the Turkish troops. The attack was made on three points, Capt. Bent leading one of the divisions. Lieut. Burke also led a detachment of Turkish troops across the river in boats. The two Sappers were attached to him and their conduct added considerable lustre to the Corps. In a fierce hand-to-hand

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struggle Lieut. Burke was killed after laying out six of the enemy. The two Sappers stood by their officer and fought like tigers but were slowly driven back. Corpl. Swann was soon disabled and narrowly escaped drowning, leaving Anderson the only British soldier with the batch.

He reorganized the Turks, killed no less than 14 Russians with his own hand and successfully withdrew the party as soon as their mission had been accomplished. Next morning Anderson crossed the river again alone and recovered the body of Lieut. Burke. This Battle of Giurgevo was won by the Turks after 10 hours' fighting but the losses on both sides were considerable. For their gallantry Swann was promoted to be 2nd Corporal and Pte. Anderson decorated, by Omar Pacha, with the Order of the Medjidie. In the *London Gazette* of January 12th, 1855, appeared the following :—

"The Queen has been pleased to grant unto Pte. Andrew Anderson, of the Sappers & Miners, her Royal license and permission that he may accept and wear the Order of the Medjidie, which the Sultan has been pleased to confer upon him, in approbation of his distinguished bravery and good conduct at the passage of the Danube on 7th July last and subsequently in rescuing the body of his Commanding Officer, Lieut. Burke, after he had fallen ; and that he may enjoy all the rights and privileges thereunto annexed. And also to command that Her Majesty's said concession and especial mark of her Royal favour be registered, together with the relative documents, in Her Majesty's College of Arms."

The 4th Company from Malta, under Capt. Craigie, and a detachment of the 3rd Company at Corfu were sent to reinforce the Corps at Varna and arrived at headquarters in August.

The Russians about this time withdrew their forces from the Danubian provinces and the second phase of the war came to an end. The Russians however still maintained Sebastopol, an important port in the Crimea on the Black Sea. This place had been very strongly fortified and was believed to be impregnable.

The Allies realized that so long as this fortress and arsenal was allowed to exist it would be difficult to ensure the continuation of the Turkish Empire as the guardian of the Bosphorus and the Dardanelles against Russian expansion towards the Mediterranean. It was consequently decided to attack it and early in September the invasion of the Crimea commenced. Since those days, our policy towards Russia has changed, and we now realize that in backing Turkey against Russia—to quote the late Lord Salisbury's phrase—"We put our money on the wrong horse."

Preliminary to the invasion, the companies of the Corps at Varna superintended contingents of the line in preparing a park of gabions, fascines, sand bags and platforms for siege purposes.

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On the 14th and 16th September the expedition landed in the Crimea near Lake Tuzla in Kalamita Bay, the force of Sappers & Miners totalling 308 of all ranks. These men performed an enormous amount of work in connection with the landing of men, guns and stores on a shelving beach in a rough sea but thanks to their efforts the matter was accomplished in record time and without mishap.

The Russians elected to oppose the progress of the Allies from the heights of the Alma and a great battle was fought here on the 20th. The British casualties amounted to 2,000 but the Russian losses were much heavier and being defeated they were compelled to retire. For this action the Sappers & Miners were distributed as follows:—

Headquarters.—3rd Company, 36.
Light Division.—10th Company, 62.
1st Division.—11th Company, 62.
2nd Division.—8th Company, 77.
3rd Division.—4th Company, 34.
4th Division.—4th Company, 35.

The outstanding feature of the invasion of the Crimea and the one that most affected the popular mind was perhaps the terrible sufferings and privations endured by the British troops. The whole story of the Crimean War is an imperishable monument to the sterling qualities of the British soldier. The military machine of England in 1854 as of France in 1870 proved grossly defective, and, as in 1870, it was lack of organization which accounted for the melting away of our splendid troops from unnecessary exposure, privation and overwork. Many thousands perished miserably in the pesthouse, misnamed a hospital, at Scutari.

Three R.E. names stand out pre-eminently in the campaign, Sir John Burgoyne, Lieut.-General Sir Harry Jones and Sir William Gordon and it may be of interest here to give some details of their careers.

Sir John Burgoyne was born in 1782 and was consequently 71 years of age when he was sent out to Turkey in 1853 to examine and report on the theatre of operations before the coming war in the East. He superintended the disembarkation of the Army on the Crimean Peninsula, chose the spot and advised the flank march after the Battle of the Alma to the south side of Sebastopol. Once in camp before Sebastopol, Burgoyne insisted on the necessity of reducing the Malakoff in order to take the city and he became more than ever the second man in the British Army and Lord Raglan's right-hand man. He underwent all the rigours of the winter campaign but was recalled to England in February, 1855. On 19th October, 1854, Lord Hardinge, on behalf of the Government, wrote as follows:—

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" You have been placed on the Staff of the Army in the East as a Lieut.-General, and in case of the absence of the Commander of the Forces, would be in command of the Army. You will, of course, name your own staff, etc., etc. . . . "

Sir John's recall was referred to by Lord Panmure, the Secretary at War in the House of Lords, who stated that he "wished to make it clear that the recall of this officer is not from any fault found with him by the Government, but arises from the fact that a younger officer has been sent out to assume the duties of Commander of the Royal Engineers and to assist Lord Raglan with scientific advice and that it has therefore been thought right to recall Sir John Burgoyne, a man now far advanced in years, from the sufferings of a Crimean winter, to resume his duties as Inspector-General of Fortifications."

The Marquis of Lansdowne followed this by stating that he " had occasion to know that Sir John had, at the earnest request of the noble Lord, the late head of the War Department, unhesitatingly sacrificed his own comfort and every other consideration for the discharge of the important duties which were confided to him. In doing so, however, Sir John Burgoyne had only acted in accordance with the whole tenour of his life which had been a continual sacrifice of his private convenience to the public service."

On September 15th, 1855, Sir Harry Jones wrote him a letter which commenced as follows :—" Sebastopol was taken by the point you always indicated—The Malakoff."

Lieut.-General Sir Harry Jones had seen a considerable amount of service in Holland, Spain, Portugal, America and France when the war with Russia broke out in 1854. He commanded the land forces in the Baltic Expedition and after demolishing the fortifications on the island of Bomarsund he was despatched to the Crimea to relieve Sir John Burgoyne. On his arrival he found the Siege of Sebastopol almost at a standstill owing to the extraordinary difficulties that had arisen through the extreme severity of the winter and the deficiency both of men and material. His untiring energy and zeal proved of the utmost value in this important post and from the moment of his arrival he became the life and soul of the attack.

He was severely wounded in the forehead by a spent grapeshot on June 18th during the unsuccessful assault on the Redan and received the special notice of Lord Raglan on that day. The result of his wound and of the exertions he had made was a severe attack of illness from which he was still suffering when the final assault on the fortress was made on September 8th. Being unable to stand he caused himself to be carried to the trenches on a stretcher in order to be present on the occasion and to give the General in Command, Sir James Simpson, the benefit of his advice. The

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result of the day's exposure was an aggravation of his illness which necessitated his removal to hospital at Scutari and subsequently to England.

Major-General Sir J. William Gordon was a Captain of some standing and fifth in seniority of the Royal Engineers selected for service in the East. But when the Siege of Sebastopol was a month old casualties had already made him the Commanding Royal Engineer of the Army. Gordon carried on his duties under the superintendence of Sir John Burgoyne and afterwards as second to Sir Harry Jones.

To write the story of the duties of Gordon of Gordon's Battery and how they were performed would be to write the history of the siege. His long-practised endurance now enabled him to do without difficulty far more than any other man would have attempted in the way of personal supervision of the works as they went on unceasingly; and during one bombardment it is reported of him that he never sat down to take a meal for three days and three nights and at its close was seen still walking along the trenches sound asleep though refusing himself rest. His valour was not so much mere courage as a perfect indifference to danger, which became a proverb in the lines. It won for him the special favour of the Naval Brigade whose soubriquet of "Old Fireworks" expressed their keen sense of his constant readiness to give the example of facing the enemy's fire whenever personal example could be of use.

A severe wound received in the right hand and arm in the great March sortie, and much neglected afterwards, broke down his health just before the siege closed, and he was absent at the surrender of the stronghold which, more than any other single man, he had contributed to make our prize. In the following year being still regimentally a Captain of Engineers but a Colonel by brevet and Aide-de-Camp to the Queen he was called suddenly to be practically the military head of his Corps as Deputy Adjutant-General; but his subsequent appointment to the important charge of the great fortifications of Portsmouth, the largest Engineer command in the country, gave his engineering abilities better scope. The irritation of his severe Crimean wounds acting on the nervous system preyed on his brain. The pain in his arm had gradually increased and latterly never left him. His very efforts to suppress outward signs of suffering served but to increase the mischief that was working within. Traces of aberration of mind were observed by his friends and a few weeks later he suddenly laid violent hands on his own life—a tragic end to a glorious career. A fine portrait by Lutyens in the R.E. Officers' Mess at Chatham fittingly commemorates "Gordon of Gordon's Battery," one of the finest heroes of the Corps.

On 27th September all the companies were sent up to Balaclava

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and were at once detailed for road making, sinking wells and repairing shattered wagons, while the 3rd Company made good a rough pier at Balaclava, at which were landed the heavy ordnance, ammunition and siege stores.

Charged with the right attack, the British held the position which approached the Tchernaya Valley, while the French spread in a curve to the left, as far almost as Chersonese Bay. The ground was a sterile waste, wild, rocky and undulated ; bleak in winter, burning in summer. Sir John Burgoyne conducted the British portion of the siege, supported by Colonel Alexander, Major J. W. Gordon and many other officers of the Corps. Colonel Alexander, from overwork and anxiety, soon died, and the executive direction of the work devolved on Major Gordon.

The British force was divided into two sections, called " right " and " left " attacks respectively, their continuity being broken by a deep ravine through which passed the Woronzoff Road. The right attack was familiarly called Gordon's Battery or parallel and the left Chapman's Battery or parallel. The right abutted on the heights overlooking the middle ravine and the left curved away to the position held by the French but separated from it by the precipitous sides of the Picket House Ravine which debouched on the head of the inner harbour. No longer attached to divisions, the 4th, 8th and 10th Companies of Sappers were detailed to the right, and the 3rd and 11th Companies to the left attack. The Engineer depôt for the right attack was stationed near the windmill on the high road leading from Sebastopol while that for the left occupied an area in rear of the 3rd Division on a plateau. At both parks the carpenters, sawyers and blacksmiths of the companies carried on their work unprotected from the weather. In order that the Sappers might be easily distinguished in the trenches, they were ordered to wear a band of white tracing tape round the forage cap.

Everywhere the lines continued to be prosecuted with commendable rapidity. Acting as overseers it was the province of the Sappers & Miners to instruct the infantry and the Turks in forming the trenches and batteries, attending themselves to those portions of the works requiring technical skill ; such as laying the gabions, fascines, sand bags and platforms ; erecting the splinterproof magazines and sloping and lining the embrasures. Formidable obstacles occasionally offered serious impediments to the progress of the excavation, for the soil was rocky ; to overcome the difficulties, the Sappers led the way with an earnestness and zeal that stimulated the workmen to activity and exertion. Such was their energy and exertion that many a brave fellow, already enfeebled by overwork, scanty rations and hard weather, succumbed.

Although harassed by the fire of the enemy no firing was indulged

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in by the Allies until the batteries had been completed and then a vigorous bombardment commenced which was hotly returned by the Russians.

After the first day's firing Sir John Burgoyne wrote to the Commander-in-Chief: "I would call Lord Raglan's attention to the great and successful exertions of the Royal Engineers and Sappers under very trying circumstances. The very rocky soil presents the extreme of difficulties to the establishment of trenches and batteries; the very act of obtaining cover in one night in such soil, which was done on every occasion, requires a great effort, and to construct in it substantial batteries, still more. The proportion of good platforms and stuff for magazines embarked, was too insignificant to be worthy of notice; these objects had to be prepared (and for a very heavy description of ordnance) from the irregular masses of timber and plank that could be procured from buildings pulled down. Notwithstanding all these difficulties, the work has been pushed on with rapidity, the substantial nature of the parapet has been proved by the few casualties incurred, and the embrasures and platforms have required, during the very heavy cannonade of yesterday, less repairs and adjustment than I have ever been witness to on similar occasions; and no accident has occurred to any magazine, although some shells have been observed to explode on them, all proving the substantial goodness of the works performed."

Among the numerous instances of energy and bravery that occurred in this bombardment was one in which Privates Jenkins and John Wallace signalized themselves under the eye of Major Biddulph, of the Artillery, Assistant Engineer. They were stationed on the 22nd October in No. 3 Battery left attack, against which the fire of several guns was concentrated with such ruinous effect that a length of about 14 ft. of the parapet was broken down before 10 o'clock in the morning. To venture into so exposed a gap in broad day, under a frightful fire, needed a considerable amount of courage but with a willing promptitude these two privates of the Sappers & Miners passed into the breach, each working for a quarter of an hour at a spell. In seven hours the damage was repaired and during the whole time the battery continued in action.

On the 25th October was fought the memorable Battle of Balaclava. Eighteen Sappers were engaged in the battle zone and subsequently received the Balaclava clasp.

On the 5th November was fought the Battle of Inkerman. The Russians some 60,000 strong sallied out from the fortress under cover of night. They were at once attacked by the British and French whose numbers totalled 14,000 only. The losses in the Anglo-French ranks were heavy but after 10 hours' fighting the Russian casualties exceeded the total force of the Allies engaged, and driven

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from the hills at all points the enemy took refuge in flight. 341 non-commissioned officers and men of the Corps received the Inkerman clasp for this battle.

After this the Siege of Sebastopol was carried on under ever-increasing difficulties. On the 14th November commenced the memorable storm which swept over the Black Sea and the Crimea. Terrific havoc was committed on land and sea. The tents were blown away, ships wrecked and driven ashore. In common with the rest of the army the Sappers & Miners felt the shock of the storm but continued their labours in the deluging rain and raging wind with uncomplaining fortitude. The road to Balaclava, the British base, soon became one long morass, and both man and horse in travelling to the port had to wade the distance up to their knees in mud. The storm was followed by snow and frost of great severity.

As the siege wore on, it was found advantageous to make each relief commence its allotted labour at the most advanced point and work backwards. The infantry parties usually opened ground as far as practicable, using straw baskets to gather earth for cover in places where it was insufficient. Wherever the pick was used it struck upon rock, which offered an unfailing obstruction to the progress of the lines. The Sappers invariably followed these surface pioneers and blasted or removed the stony portions. "In this service," it is recorded, "these men's exertions have been altogether invaluable and such as could not be supplied from any other part of the Army."

On 1st December the strength of the Corps in the East was as follows:—

Present at the siege and effective	401
Sick in field hospitals..	40
Balaclava	23
Bucharest	14
Varna	17
Gallipoli	11
Constantinople and Scutari	18
Total	524

A tiny force for the extreme exigencies of the case.

Two Sappers in charge of the field electric telegraph for service in the Crimea, arrived at Balaclava on the 7th December, bringing with them the instruments, batteries, insulated wire and appliances packed in two waggons. Twenty-four coils of wire each a mile long were packed in them. The apparatus, only available for short distances, was worked by six or eight men.

The 2nd Company of 113 strong, under Capt. King, reinforced the Corps in the Crimea on the 20th December and on Christmas Day moved up to assist in the right attack.

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In January the small detachment under Major Bent, of the Engineers, proceeded to the Crimea from Bucharest, and the following despatch from Colonel Simmons, R.E., Commissioner with the Turkish forces, was communicated by Lord Raglan to the Minister of War :—

VARNA,
January 8th, 1855.

MY LORD,

His Highness Omar Pasha has requested me to write to your Lordship, to return his best thanks for the services rendered to his army by Major Bent, of the Royal Engineers, and the detachment of Sappers under his command.

His Highness desires me to express his regret at the losses which have been sustained by this small detachment, who, under the direction of Major Bent, have well sustained the character of the British Army.

His Highness has already expressed to your Lordship his regret at the loss of Lieut. Burke, of the Royal Engineers, whom his Highness considers to have been an officer of much merit.

His Highness desires me to inform your Lordship that he has done himself the honour to write to the Turkish Ambassador at the Court of St. James's expressing the desire of His Majesty the Sultan that Private Andrew Anderson, of the Royal Sappers & Miners, may receive and wear the decoration of the fourth class of the Order of Medjidie, in commemoration of his gallantry in recovering the body of Lieut. Burke after he was killed at the passing of the Danube on the 7th July last. In the meantime he has presented Private Anderson with the decoration and trusts your Lordship will allow him to wear it until the commands of Her Majesty may be received.

His Highness further desires me to express to your Lordship his entire approbation of the manner in which Major Bent has conducted his duties.

He desires me to inform your Lordship that this officer showed great energy in his endeavours to enter Silistria before the siege was raised; that he subsequently showed great gallantry at the passage of the Danube, when he was the first to land on the left bank and covered the landing of the Turkish troops with a detachment of riflemen, who maintained their ground under a heavy fire until the disembarkation of the supports was effected.

Major Bent and his Sappers were subsequently of great service in throwing up the *tête de pont* at Giurgevo and in the construction of the bridge across the Danube.

* * * * *

His Highness desires me to add, that it would be very gratifying to him if Her Majesty could in any way reward these officers for the able services they have rendered to the Ottoman Army and the common cause.

I am, etc.,
(*Signed*) J. L. A. SIMMONS, *Lieut.-Colonel.*

Field Marshal LORD RAGLAN, G.C.B., etc.

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For some period in the new year, the weather continued so inclement that very little progress was made in the works. On several occasions the line parties could not be employed for this reason. Directed by their officers, the Sappers only held their posts and laboured as best they could against the stinging storms and winds which swept over the frosted hills. Many were frostbitten and several died, yet amid all this severity they blasted the rock, made loopholes, erected gabion revetments, and where the drift had piled the snow in the more important excavations, removed it with incredible energy.

It is recorded in the trench Journal for the night of January 7th Right Attack, "All the work was done by the Sappers, the bad weather preventing the employment of working parties of the Line." And again for the night of January 16th Right Attack, "The Sappers cleared away the snow from the left approach. As the weather was very bad neither Turks nor Linesmen could be employed."

Up to the 3rd February the staple work in the trenches was the removal of snow, and then followed an interval during which the men were up to the knees in mud. To remove this obstruction the drainage was improved and otherwise facilitated by making additional openings in the parapets to carry off the water and convey it by natural channels down the slopes of the hills into the ravines. These impediments, though they greatly interfered with the general progress, did not slacken the exertions of the Sappers, who were everywhere seen blasting rock, building magazines, making traverses, etc. So far it was found impracticable to do more than keep the current constructions in tolerable repair. To advance was out of the question. Some French officers of Engineers who had observed from the beginning the firm and laborious activity of the Sappers spoke of them with admiration, and Sir John Burgoyne in a letter dated 5th February, 1855, quotes them as constantly saying "*Des Braves Soldats, et des bons Sapeurs et Travailleurs.*"

The 1st Company, 101 strong, under the command of Capt. J. M. F. Browne, of the Engineers, landed at Balaclava on the 7th February and it was soon moved up for trench duty.

With an improvement in the weather considerable progress was made. Both right and left attacks were developed but so great was the strain that was thrown on the Sappers that it was decided to augment the Corps. Accordingly on 22nd March authority was given for forming four new companies which were designated the 23rd, 24th, 25th and 26th. The first two were raised on 1st April and the others were not embodied before September and October.

Hitherto the Engineers had to depend for transport on the resources of other departments but as this caused considerable trouble and delay the 23rd Company was constituted a driver troop for the conveyance of the Royal Engineer field equipment.

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In April the exertions of the Allies were beginning to bear fruit. Everywhere in various forms were rising works, which, had it not been for the wide expanse of stony clay and rock which covered the hills, would by this time have almost intermingled with the advanced positions of the Russians. Where the pick could not penetrate, blasting was commonly resorted to for dislodging the stones. At particularly hard and exposed work it was impossible to employ any but Sappers.

On the 9th April, as most of the works were ready, the second bombardment of Sebastopol was commenced with 101 guns and mortars on our side. The enemy had the exact range of our batteries and trenches and as they had a preponderance of heavy guns our bombardment was carried on at a serious disadvantage. Very extensive damage was caused to our works by the enemy's fire but the extraordinary efforts of the Sappers enabled the guns to keep in action. The *Times* of 26th April, 1855, referring to the officers and men at this date says :— " It is impossible to deny to the Russian Engineers great credit for the coolness with which they set about repairing damages under fire ; but words cannot do more than justice to the exertions of our own men and to the Engineer officers and Sappers engaged in this most perilous duty. When an embrasure is struck and injured it is the business of the Sappers to get into the vacant space and repair the damage, removing the gabions, etc., under fire, and without the least cover from shot, shell or riflemen. Our Engineer officers have frequently set the example to their men in exposing themselves when not called upon to do so ; and I believe that, as yet, there has not been a single instance in which a gun has been silent owing to damage done to an embrasure. The officers and men charged with this dangerous work have not waited for the cover of night to effect repairs but have carried them on in the face of the enemy."

The rifle pits on the left advance sap of the right attack had fatally annoyed the besiegers in their foremost works, and it was determined either to destroy or seize them. 600 men of the 77th Regiment were told off for the assault and at 9.30 p.m. on the 19th April they attacked and captured the pits. The Sappers with a working party, under the command of Capt. H. C. C. Owen and Lieut. Baynes, of the Engineers, at once started to consolidate the position. The Russian gabions were quickly faced about, sand bags thrown down, and in a short time the enemy's pits were incorporated with a communication which led to the boyau in the rear. The lodgment was achieved in about two hours under a roar of missiles from rifles and guns. Two attempts were made by the enemy to recover possession of the pits. The first was very nearly successful. The covering party were driven in, Capt. Owen was dangerously wounded and Lieut. Baynes was killed. Colour-Sergt. McDonald, of the Sappers,

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then took charge of the discomfited British troops. Seeing the Russians still advancing over the works he ordered the working party to kneel, fire a volley and charge. These orders were implicitly obeyed, and McDonald with drawn sword backed by the other Sappers with bayonets drove the enemy back and retook the pits. A portion of the covering party was now distributed in front of the works under the direct command of Lieut.-Colonel Tylden. The second attempt to recover the pits was made by the Russians about three hours after they had first been captured by the British but this time, although the covering party were driven in, the lodgment had been so well completed that the troops holding it made sure work of the defence and the Russians hastily retreated.

The following order was subsequently promulgated to the troops :—

"BRIGADE ORDERS BEFORE SEBASTOPOL,
"*April 23rd*, 1855.

"It was with much satisfaction that the Major-General Commanding received Lieut.-Colonel Tylden's report of the able manner in which, on the night of the 19th instant, a lodgment was effected in the enemy's rifle pits immediately in front of the left advance 'right attack' under Capt. Owen and Lieut. Baynes, R.E., whose zeal and gallantry were most conspicuous, while the conduct of Colour-Sergt. McDonald, Royal Sappers & Miners, on the same occasion, when, in consequence of the above-named officers being severely wounded, he was left in charge of the working party, was not only highly creditable to that non-commissioned officer, but so distinguished as to attract the notice of the Field Officer Commanding in the trench, and the Major-General is glad to find that the Sappers engaged exerted themselves with their accustomed energy."

So effective an adjunct of the siege did the rifle screen become that pits were made in the left attack. The chain of pits consisted of 40 holes distributed over the ground with light troops in commanding positions. These were commenced by Lieut. C. G. Gordon, of the Engineers. In time the pits became an enlarged item in the system of attack, and formed occasionally the starting points from which new zigzags or parallels were struck out. Old pits, moreover, which had been abandoned by the Russians—as the besiegers' works compressed their circumvallation—were taken advantage of and turned against them.

Major-General Jones reviewed the Corps in the Crimea on the 25th May. Seven companies were on parade, one company being at that time with the Kertch Expedition. Owing to casualties, sickness, etc., the parade hardly exceeded 400 bayonets, but the General, in reporting on the parade, to Sir John Burgoyne, wrote :—

"It affords me great pleasure to be enabled to state that the appearance of the men was most satisfactory and more so than

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might have been expected after the severe trials they had to undergo during the severity of the winter and their constant and very laborious duties in the trenches since October last, and which they have performed with a zeal and readiness which reflects the highest credit upon them."

A French officer of high rank who had served before Sebastopol wrote to a brother officer on the soldierly qualities of the British Army and a translation appeared in the *Daily News* on the same day that the Major-General's inspection was held. "I will begin," says the writer, "with the English Engineers, a Corps which, from what I have seen of its working, can never have been excelled and seldom equalled in any army in the world. The education of the officers, the training and intelligence of the men, the activity of the whole Corps, and the manner in which they carry on their works, are fully equal to the same qualifications in our own regiments of Engineers. Of the courage of these troops I need not speak—they are like the rest of the English brave almost to a fault. If ever there was a corps of which a nation should be proud it is that of the English Engineers, or Sappers & Miners, as the men are called, whilst the regiment itself and the officers are called the Royal Engineers."

June, the ninth month of the siege, arrived but the end of the struggle was not yet in sight. As the works were spreading it was clear that a reinforcement of Sappers was essential, and on 4th the 9th Company landed at Balaclava under Capt. Dawson 118 strong. This reinforcement was added to the "right attack."

It was arranged at headquarters to make another assault preceded by an uninterrupted cannonade of some hours' duration. Accordingly at 3 p.m. on the 6th June the third bombardment started. Eventually the infantry rushed forward and after extremely heavy fighting against overwhelming odds succeeded in capturing the Quarries and the appended work, while the French had been equally successful against the White Works and the Mamelon. The Engineers, Sappers & Miners, again distinguished themselves in this attack, and it was owing entirely to their extraordinary efforts that the besiegers were able to repulse the repeated and determined counter-attacks which the enemy launched against the captured works.

Lord Raglan in writing of this action under date of 9th June, said: "Notwithstanding the frequency of the endeavours of the Russians to regain possession of the Quarries, and the interruptions to the work to which these attacks gave rise, Lieut.-Colonel Tylden was enabled to effect the lodgment and to establish the communication with the advanced parallel; and this redounds greatly to his credit and that of the officers and men employed as the working party; and I cannot omit this opportunity to express my approbation of the conduct of the Sappers throughout the operations."

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At 1 o'clock on the morning of the 17th June the fourth bombardment began when it was decided to assault the Redan and the Malakoff. To the French was assigned the attack on the Malakoff; to the British that on the Redan. Four columns of the latter were formed up, the first to enter the left face between the flanking batteries; the second the salient angle of the work; the third the re-entering angle formed by the face and flank, and the fourth, moving towards the Woronzoff Ravine, to enter the right flank of the Redan.

The right column to scale the re-entering angle was formed up in the trench leading out of the right of the Quarries in the following order:—

100 Riflemen as skirmishers. 8 Sappers & Miners. 4 carpenters with cutting tools, powder bags, etc. 50 Riflemen, each with a wool bag.	Under Lieut. Fisher, R.E., with Sergt. John Landry, of the Royal Sappers & Miners.
60 ,, carrying ladders. 60 seamen ,, ,, 400 storming party.	Under Lieut. Graves, R.E.
800 supports.	Under Capt. Jesse, R.E.
2 detachments of Sappers for the lodgment. 400 working party with 200 picks. and 200 shovels and gabions.	Under Lieut. Somerville, R.E.

The other columns were marshalled in similar sequence, and the officers allotted to the left column to attack the right flank of the Redan were as follows:—

Lieut. Murray, R.E., to lead skirmishers and Sappers with Sergt. John Coppin.

Lieut. Graham, R.E., to lead the parties with wool bags and ladders.

Major Bent, R.E., to lead the storming party and supports.

Lieut. C. G. Gordon, R.E., to control the working party with two detachments of Sappers.

At 3 a.m. the right column debouched from the Quarries and advanced steadily on the Redan. Simultaneously the left column advanced under the command of Sir John Campbell. Both columns were met with an appalling cross fire, and in spite of the most heroic efforts of both leaders and men the attack withered away and the few survivors retired to the trenches. Again the attack was organized in the same order as before. Steadily and firmly they advanced, but were met with a crashing and annihilating fire. A few more rushes were attempted, succeeded by a halt that

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showed the enterprise was impossible ; and swept back by a continuous roll of musketry and shells which no troops could have withstood, the attacks were driven back into the trenches.

Under Lieut. Neville 30 Sappers with destroying implements and powder bags were detailed to act with Brig.-General Barnard's Division which was to move forward and capture the Barrack Battery as soon as the Redan and Malakoff had been taken. A short reconnaissance showed Lieut. Neville that the attackers were not succeeding and he sent Corpl. Jenkins with a message to General Barnard, which was duly delivered. Standing near was Colonel Waddy, of the 50th Regiment, who had been appointed to lead the stormers of General Barnard's column, and he expressed a keen desire to go to the front, and see how things were for himself, if anyone would show him the way. "Follow the Sapper," said Jenkins, using the catch phrase of the trenches, and Colonel Waddy duly following was conducted to the Quarries where he was able to see the utter impossibility of carrying out his part of the business.

Of 2nd Corpl. Wm. Baker, 3rd Co., the following story has been told :—He was on duty in the third parallel and left it without orders, attaching himself to the 38th Regiment. Oblivious of the fact that he was not in charge of a working party in the saps, he cheered on the men with the inspiriting cry "Now, my boys, follow the Sapper." In the excitement of the moment he caught up the expression because it had become a settled byword of the trenches. Baker was killed.

The casualties amongst the English troops this day were very great. Both officers who led the columns on the Redan were killed. Nearly all the Engineer officers were hit and Major-General Jones was wounded in the head. The French in their attack on the Malakoff lost 2 generals, 37 officers and 1,544 men killed, wounded, and missing, while the Russians lost 5,776 of all ranks killed and wounded.

Lord Raglan, weakened by disease and ill-able to bear the defeat, survived it only a few days, and the command of the British troops then devolved upon General Simpson, the chief officer of Lord Raglan's Staff.

Following this abortive attack the siege was prosecuted with even greater vigour. New and more advanced trenches were opened up, and bombardments of varying intensity carried out by the Allies. The Russians made several sorties, all of which were unavailing.

Privation, hardship, and danger continued to be the lot of all ranks until orders were again given to assault the Redan and Malakoff. The former was assigned to the British and the latter to the French. The assault was ordered to take place at mid-day on 9th September.

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For the assault a column from the 2nd and Light Divisions was formed as follows :—

	Men.	
Covering party ..	200	To keep down enemy's fire.
Armed party	320	To carry and place ladders, under Lieut. Ranken, R.E.
Main body	1,000	
Armed working party ..	200	With entrenching tools, under Capt. Sedley, R.E.
Supports	1,500	
Gunners	20	With spikes to spike guns.
Additional supports ..	3,000	Drawn up in 3rd parallel communicating with French right attack.

The storming party was directed by Brig.-General Windham. Sir Harry Jones, the Chief Engineer, though suffering from an attack of sciatica, and barely recovered from his wound, was borne to the sap on a litter to witness the assault. The assault was partly successful. Assailed by a terrific fire the French captured the Malakoff and the Little Redan, were driven out again, but recovered and held on to the Malakoff at a fearful sacrifice. The British also advanced and certain units succeeded in reaching the ditch surrounding the Redan. Ladders were placed and the remnants of the storming party who had been carefully selected for their proved courage endeavoured to obtain a footing in the work. Earth was thrown from the parapets above, and the gabions by extraordinary exertions were loaded with sand and stones dislodged from the revetment and grubbed up from the bed of the ditch. In this way partial cover was obtained, but it was yet too shallow to protect the troops from the overwhelming musketry that enfiladed the ditch. While these engineering details were being stubbornly executed the troops in the Redan, vainly waiting for two hours for an opportunity to dash into the town and rapidly diminishing in numbers, were forced to evacuate the work. With them retired the working party, the ladder men and Sappers, but in crossing the open again, so fierce was the fire on the repulsed stormers that the casualties were enormous. The assault having failed, Capt. Montague who was in command of the Royal Engineer department for the day, employed in the afternoon such Sappers as were available in continuing the right advance sap. So wearied and stricken were the Russians by their exertions and losses that they permitted the approach to proceed unmolested.

During the next few hours fires broke out in several places in Sebastopol, and magazines blew up. As soon as it was night Corpl. John Ross went out to look for a fallen comrade who had last been

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seen near the ditch of the Redan. Having found the wounded soldier he was in search of, Ross proceeded to make a closer inspection of the famous outwork and creeping warily up the ramp made during the unsuccessful assault he discovered that the position had been evacuated by the enemy. Returning and reporting his discovery Ross was received with incredulity, but he was able to convince his officers of the truth of his statement, and General Simpson, who had intended to renew the assault at daybreak, gave orders for the occupation of the place. At dawn the troops marched unchecked into the Redan and took possession of the town which the enemy had evacuated. So ended a conflict carried through a period of 337 days made up of a freezing winter and a wasting summer. The fieldworks were of colossal magnitude and masterpieces of field art reared in rocky ground amid hardships and catastrophes, harassed by sorties, surprises and alarms, opposed by tempests of shell and shot, grape canister and Minie's. Out of a force of 935 of all ranks of the Sappers & Miners there were 445 casualties.

The field electric telegraph used for the first time in any campaign came first into operation a few months after the great storm of November, 1854, and was placed under the direction of Lieut. Stopford. From him it passed to Capt. F. Du Cane, and in September, 1855, to Lieut. Fisher. The completed system made up a length of nearly 24 miles and connected up eight stations.

Sebastopol had been attacked in order to cripple Russian sea power in the Black Sea. The fall of the fortress enabled the work of demolition of the harbour and docks to be completed at leisure. This was a work of considerable magnitude and was carried out by Sappers & Miners under their R.E. officers. By the 6th February the last explosion took place and the famous docks of Sebastopol, which were one of the wonders of the Russian Empire, were a thing of the past.

National policy changes with the international political situation. Since the Crimean War of 1854–56, the wars of 1864, 1866 and 1870 raised Prussia to a predominant position in Europe, and the foundation of the German Empire in 1871 completely altered the old European equilibrium. Slowly but surely—as England recognized that German philosophy and German sea power threatened the foundations of European civilization—has the policy of this country changed towards Russia. No longer do we fight to uphold the Turkish Empire and to deny to Russia the entrance to the Mediterranean. But although the policy that led to the Crimean War is an obsolete one, never can Englishmen forget the stubborn gallantry of the men who held their ground on the bleak upland of the Chersonese, and who proved once more—as so often in our "rough Island story"—that although the least military, England is one of the most warlike of the nations of the earth.

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FERRO-CONCRETE BRIDGE, HIGH WYCOMBE.

In the February number of *Ferro-Concrete* an account is given of the testing of a highway bridge built in Mouchel-Hennebique ferro-concrete at High Wycombe.

The bridge consists of a single arch span of 30 ft. between the abutments and measures 36 ft. wide between the parapets. The carriage way is 24 ft. wide, having a 6 ft. foot-walk on each side.

The total test load was 35 tons (a steam roller, 10 tons; a traction engine, 15 tons; and a laden lorry, 10 tons).

For the purpose of registering deflection of the arch under load three sensitive deflectometers of the Mouchel type were placed on trestles in the stream beneath the bridge, instrument No. 1 being at the centre, instrument No. 2 midway between the centre and the springing on the south side, and instrument No. 3 midway between the centre and the springing on the north side. Particulars and results of the tests are as follows:—

No. 1, Steam Roller (10 *tons*), *on Centre of Bridge.*—No deflections.

No. 2, Traction Engine (15 *tons*) *on Centre of Bridge.*—Deflection of three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the centre of the span, but no deflection at the sides.

No. 3, Traction Engine (15 *tons*) *with Lorry* (10 *tons*) *behind.*—Deflection of two-tenths of a millimetre, or $\frac{1}{128}$ inch, at the centre of the span, and a deflection of one-tenth of a millimetre, or $\frac{1}{256}$ inch at the sides.

No. 4, Traction Engine (15 *tons*) *with Lorry* (10 *tons*) *on centre with Steam Roller at side on centre line.*—Deflections of one-tenth of a millimetre, or $\frac{1}{256}$ inch, at the south side; one-tenth of a millimetre, or $\frac{1}{256}$ inch, at the north side; and three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the centre of the span.

No. 5, Traction Engine, Lorry and Steam Roller side by side across the centre of the Bridge. Total load—35 *tons.*—Deflections of three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the south side; three-tenths of a millimetre, or $\frac{1}{85}$ inch, at the north side; seven-tenths of a millimetre, or $\frac{1}{36}$ inch, at the centre of the span.

The results testify to the highly conservative nature of the design, for the maximum deflection of $\frac{1}{36}$ inch under the full test load is only a shade more than $\frac{1}{13000}$ of the span of the arch. This implies a very high factor of safety and a reserve strength far greater than that specified by the Local Government Board.

The excess of elastic strength possessed by the bridge over that stipulated should not be regarded either as an accidental occurrence or as an evidence of wasteful design. On the contrary, it is the result of a theory entertained by the Local Government Board to the effect

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that a monolithic ferro-concrete bridge structure must be considered as if it consisted of an indefinite number of longitudinal strips, each capable of acting quite independently of all other longitudinal strips making up the width of the structure. It is well known to engineers who have studied the subject of applied mechanics that a condition such as this cannot exist in an arched or other framed structure of iron or timber, and it is still more impossible in the case of monolithic ferro-concrete construction, where the absolute continuity of the material in every direction results in a condition of perfect interdependence and enables parts of the structure not under the direct influence of the loading applied to contribute effectively to the resistance of those parts which are loaded or are subject to strain of any kind. An interesting proof of the above is afforded by a comparison of Tests No. 1 and No. 5. Thus, in Test No. 1, when the 10-ton steam roller was placed at the centre of the span the deflection was so small that it could not be measured on the highly sensitive instrument employed. But in Test No. 5, when the 10-ton steam roller, the 10-ton lorry, and the 15-ton traction engine were placed side by side in parallel across the centre of the span, the maximum deflection on the centre line reached seven-tenths of a millimetre.

In the first case, the 24 ft. wide roadway had one load of 10 tons on the middle third, and if that part of the arch carrying the roadway had been capable of acting, in accordance with the Local Government Board theory, as if it were made up of three independent longitudinal strips, each 8 ft. wide, it is obvious that the load would have caused a very perceptible deflection. The reason why no deflection could be detected was that the strain caused by the 10-ton load was distributed right and left to a far greater distance than that fixed by the arbitrary limit imposed on the designers, the result being that the assistance afforded by the outer portions of the arch to the portion immediately under the load was so important that the load made practically no impression on the bridge.

On the other hand, when the three vehicles were placed side by side at the centre of the bridge, the two outer thirds of the arch were engaged in withstanding the stresses due to the two outer loads, and it must be borne in mind that each of the two outer thirds had the assistance of a strip of the arch beneath the footpath and curb, and also beneath part of the roadway outside the outer wheels of the load. The only part of the structure then available for withstanding the stresses due to the 10-ton load over the middle third was the strip immediately beneath the load Consequently the deflection was more perceptible than in the case of Test No. 1, and for the reasons stated above, it was greater under the middle load than under the two outer loads. Thus the comparison of the tests mentioned absolutely contradicts the theory to which allusion has been made, and throws useful light upon the question of the stresses in ferro-concrete.

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REVIEW.

PAGES D'HISTOIRE, 1914—1916.

(Librairie Militaire Berger-Levrault, Paris : 5, Rue des Beaux-Arts).

The first review of the *Pages d'Histoire* series appeared in the *R.E. Journal* for February, 1915 ; in that and in subsequent numbers of the *Journal* have been published reviews and notices relating to the first hundred numbers of the series, the last of them in the *Journal* for March, 1917.

The 101st number of the series is entitled *Le Nerf de la Guerre ;* in it Monsieur G. Cerfberr de Médelsheim deals with the important question of the financial measures adopted by the French Government to obtain funds for the successful prosecution of the War. In an introductory section, Monsieur de Médelsheim briefly reviews the financial situation in France in pre-war days, the resources of the French Treasury and matters connected with the floating of loans. He states that he is not concerned here with the political, diplomatic, naval and military mistakes made by his government ; they were numerous, and many of them brought terrible consequences in their train. Turning to the subject dealt with in this volume, he remarks that if the history of the financial measures adopted in France, after the declaration of War by Germany and Austria, be passed in review it will be found that the French Government adopted an unfortunate vacillating attitude and further aggravated an already difficult situation by the several false moves which it made. He further tells us that for the past ten years the financial and fiscal policy of France has been governed by the popular cry : No loans, no new taxes. The wisdom of the policy indicated by the cry in question is not challenged, particularly in view of the abuses which crept in in connection with the borrowings of the French Government by way of loan on various occasions since 1871. Between the year last mentioned and 1894, the Government had raised loans amounting to over 452¾ millions sterling ; in respect of more than one-half of the above amount, representing the War indemnity paid to Germany and sums spent on the reorganization of the Military and Civil Services, the interest payable was 5 per cent. per annum.

These loans were of little or no profit to the country, since the money was spent either outside France or in respect of services which were unproductive.

In view of the policy forced on the Government, that no loans should be raised and no new taxes levied, the French Government has had recourse to the expedients similar to those often resorted to by those in embarrassed financial circumstances, namely, the issue of Treasury scrip

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for short terms, borrowings from banking houses against future revenue, raising of money by mortgage on Government securities, etc. In ordinary times no difficulty was experienced in carrying through operations of the kind referred to; nevertheless, many inconveniences attached to these methods of finance, one of the most serious being the possibility of the lenders, in large bodies, suddenly demanding the immediate return of the amounts advanced by them at the expiration of one or other of the short periods for which their money was lent.

Just before the declaration of the present War the needs of the French Government were increasing and it was recognized that the raising of a loan could no longer be avoided; and at the end of June, 1914, the Government decided to invite subscriptions for a loan of 32 millions sterling at 3½ per cent. per annum, repayable in 25 years. Applications for allotment closed on the 7th July, 1914, and by that date, the loan had been subscribed forty times over. But it was the banks, and not the public, that largely held this loan, and, in consequence, on the outbreak of war a somewhat embarrassing situation arose which was only removed by the resort to costly expedients. The fixed National Debt of France at the outbreak of war was 1,600 millions sterling, and in addition there was a floating debt of 64 millions sterling.

The War produced other complications; many people desired at once to realize their capital, difficulties were created owing to the international character of modern finance, the Government had on hand a large stock of paper in connection with the unplaced portion of the loan and, in the meantime, the Treasury was calling for the cash which this represented, etc. To meet the situation the French Government had to declare a Moratorium and this eased the situation to some extent.

In the second section of this volume Monsieur de Médelsheim deals with the facilities which the French Government possesses for obtaining funds immediately on the outbreak of a war. He tells us that it is on the Banque de France that the French Government relies for financial assistance in emergencies. This bank was established by Napoleon I. on an excellent monopolistic basis; in peace time it is a private institution, but on the outbreak of war it becomes a cogwheel in the governmental machinery.

A great deal of interesting information is given by Monsieur de Médelsheim concerning this bank, the nature of its Charter, the agreements entered into between it and the Government in relation to loans to the latter, and its solvency at the present time.

One of the earliest methods adopted by the French Government to obtain financial support for the present War from the French masses was by the issue of the so-called *Bons de la Défense Nationale*. The *Bons* bear interest at 5 per cent. per annum payable in advance; the actual interest therefore is 55·26 per cent. per annum. The *Bons* are repayable at 3, 6 or 12 months; the subject is fully discussed in the third section of this volume. The banking institutions of France have played a most important part in connection with the placing of these *Bons*; six of the most important of these institutions took up, either for themselves or on behalf of their clients, no less than 3,195½ million francs worth of this issue during the first 15 months from the date of the crea-

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tion of the *Bons de la Défense Nationale, i.e.* up to the 31st December, 1915. In a report dated 29th January, 1915, by Monsieur Aimond, it is stated that in the 3½ months from 15th September to 31st December, 1914, the public took up about 1,687¼ million francs worth of these *Bons*; the denomination most greatly in demand being those having a face value of 1,000 francs, more than 723 million francs worth of certificates of this denomination being included in the figure last quoted. The measure of the support given to the *Bons* by the public may be further gauged from the record for the year ending 31st December, 1915; the total amount thus raised during the 12 months in question being no less a sum than 16,389,273,300 francs (*i.e.* over 655½ millions sterling, at the normal rate of exchange).

In the fourth section of this volume Monsieur de Médelsheim points out that in creating the *Bons de la Défense Nationale*, the French Government chose a means for raising funds which was, to say the least, precarious.

As long as the military situation remained satisfactory perhaps no very great inconvenience was likely to be experienced by the Government in connection with this issue, but let the confidence of the public be shaken by a series of untoward events, then there would be no saying as to the nature of the difficulties which the Government might have to face. The danger always existed that the public might refuse to renew their short term advances, and, if they did so, the possibility of successfully raising the immense sums required for the prosecution of the War by means of a long term loan would, under such circumstances, probably become exceedingly small.

The duration of the War being an uncertain period, there was an advantage in raising funds by short period loans, bearing a relatively high rate of interest, loans which could be converted advantageously by issues bearing smaller rates of interest once peace reigned again and the markets were favourable for such a conversion. This was the policy which found favour with the French Government and, on the 10th February, 1915, it authorized the raising of a short term loan, known as *Obligations de la Défense Nationale*. These *Obligations* carried interest at 5 per cent. per annum and were repayable at par on the 16th February, 1925; the Government might, however, repay these *Obligations* at par at any date subsequent to the 16th February, 1920, with interest for the full original period of the loan. The price of issue was 96 fr. 50 c. per cent. These terms made the *Obligations* more attractive than the *Bons* for on the basis of the earlier repayment the actual interest worked out at between 5½ and 6 per cent. per annum. During the year 1915, the public took up 3,500 millions worth of these *Obligations*. The issue of these *Obligations* has not superseded the issue of *Bons*; the French Government is accepting subscriptions in respect of both these issues concurrently.

Monsieur de Médelsheim deals in considerable detail with the work of issuing these *Obligations*. One of the features of the situation was the great amount of female labour which was employed in connection with this work; the experiment appears to have proved eminently successful. In this section of the volume Monsieur de Médelsheim deals

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also with the financial relations of France with foreign countries, problems connected with monetary exchange values, and those connected with the drainage on gold reserves.

The fifth and last section of the volume deals with the third scheme by means of which the French Government raised additional funds for the conduct of the War, namely the 5 per cent. National Defence Loan authorized by an Act of Parliament of the 11th November, 1915. The expenses of the War had gone on increasing and the French Government found itself under a necessity of providing the sum of 120 millions sterling per mensem. Although the *Bons* and *Obligations de la Défense Nationale* had enabled the Government to raise exceedingly large sums of money, nevertheless it felt that, in the sixteenth month of the War, the time had arrived for the consolidation and conversion of a part of the *Bons* and *Obligations*, and also for asking the public to make yet another effort to provide further funds for a vigorous prosecution of the War. The new loan, although nominally only carrying interest at 5 per cent. per annum, was issued on such terms that the interest payable actually represents $5\frac{1}{2}$ per cent. per annum on the money invested in it. Full particulars of this loan and many details concerning the arrangements made for its issue are contained in the number under review. This loan like its predecessors was well received by the public. In a report made to the Chamber of Deputies on the 14th March, 1916, it was stated that the 1915 5 per cent. loan had up to the 29th February, 1916, brought in 11,460,430,000 francs (*i.e.* nearly $458\frac{1}{2}$ millions sterling, at normal rates of exchange); 1,200 million francs of this sum having been subscribed in America. Not only was this loan subscribed to in Great Britain and her Colonies, but it was also taken up in many neutral countries, notably in Switzerland, Holland, Spain, Norway, Portugal, and Denmark so far as Europe is concerned.

In conclusion, Monsieur de Médelsheim points out that France is in a better financial position than Germany at the present time; being richer than her adversary, she is to this extent the stronger of the two.

The 102nd number contains the *Reply of the Belgian Government to the German White Book of the 10th May*, 1915. The editors in an introductory note point out that the official publication containing the Belgian Government's reply to the German accusations against the civil population of Belgium concerning the alleged violation of the Law of Nations is dated 25th February, 1916, and was issued to the public in April, 1916. The original document is too bulky (consisting of 528 quarto pages), they say, to appeal to the masses either in belligerent, or in neutral, countries. It has been thought, however, that an analysis giving the main line of argument and an outline of the principal documents contained in the official publication could not fail to be well received; in consequence, the Belgian Minister for Foreign Affairs having sanctioned the adoption of the course referred to, Monsieur Fernand Passelecq has undertaken a critical examination of the official text which appears in the number of the *Pages d'Histoire* series now under review. The editors further call attention to the fact that a part of this analysis has already appeared in the *Revue de Deux Mondes* for 15th April, 1916. Monsieur

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Passelecq points out that, having outrageously violated the neutrality of Belgium and having ruthlessly ravaged this little country, Germany now seeks, with deep hatred, to disparage the Belgian people. In May, 1915, the German Government published a series of accusations against the Belgians in a work entitled *Die Völkerrectswidrige Führung des Belgischen Volkskriegs* (guerilla warfare conducted by the Belgian people in violation of the Law of Nations).

The appearance of this monumental official work consisting of 328 quarto pages naturally excited the popular imagination. It is one of those "scientific" productions for which German officialdom is renowned. In addition to an introductory memorandum prepared by the German Foreign Office and dated 10th May, 1915, it contains four reports purporting to deal with incidents at Aerschot, Andenne, Dinant, and Louvain. These reports were prepared by a Military Commission assembled at Berlin; they contain three main accusations:—

1. The civil population of Belgium offered armed resistance to German troops in an authorized manner and were guilty of horrible cruelties to the German wounded.

2. The Belgian Government not only took no steps to prevent this "Guerilla Warfare" contrary to the Law of Nations, but really secretly instigated it and supported it.

3. The Belgian Commission of Inquiry has disseminated calumnious reports against the German Army.

The Belgian Government was bound to take up the challenge thus thrown down, and in spite of the difficulties experienced, owing to the fact that the greater part of Belgium was in enemy hands, it has nevertheless collected a large volume of evidence which completely disproves the German accusation.

The Belgian reply to the German White Book is divided into three parts:—

The first part, which consists of a general statement, analogous to the introductory memorandum to the German White Book, is devoted to a logical and synthetic examination of the accusations directed by Germany against the Belgian Government (Chap. I.), against the Belgian people (Chap. II.) and against the Belgian Commission of Inquiry (Chap. III.)

The second part contains a detailed and critical examination of the four reports of the German Military Commission and the appendices attached thereto.

The third part is in the form of an appendix and contains copies of documentary evidence in support of the Belgian reply.

Monsieur Passelecq points out that the apologists for the conduct of the German troops have more than once shifted their ground. They commenced by systematically denying that any atrocities were committed, alleging that the accusations were attributable to the "collective hysteria" of the masses in Belgium; then, when a general denial was no longer tenable, they tried to explain away and excuse the acts committed by attributing them, in part, to excesses on part of individual soldiers or excusable mistakes on the part of combatants, but above all to acts of perfidious hostility on the part of the Belgian civil population.

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The German White Book has adopted the last of these hypotheses and attempts deliberately to justify the atrocities by applying the term "*necessary reprisals*" to the acts of the German soldiers, and by endeavouring to saddle the Government and people of Belgium with all responsibility, alleging resistance was offered to the German Army in a manner not authorized by the Law of Nations.

The German White Book therefore endeavours to take its stand on the Hague Conventions. This is no doubt astute as a tactical manœuvre. By passing directly to the question of the law governing the situation, the Germans have attempted to evade the issue regarding the facts of the situation. Germany, however, has to reconcile her present attitude on this matter with the doctrines laid down by the German Great General Staff in the famous *Kriegsbrauch im Landkriege*, issued in 1902, three years after the First Conference at the Hague, doctrines which are in serious conflict with the principles advocated and accepted at the Hague.

The Belgian reply contains a most energetic protest against the imputations made by Germany, imputations which are as false as they are odious.

The Belgian reply next goes into the question of the numbers of Belgians, men, women and children put to death by the German soldiery, the numbers deported, the burning and pillaging of private dwellings, etc. The value of the German evidence dealing with the alleged offences of these wretched people is analyzed and it is pointed out that out of 209 documents, attached to the German reports, bearing a determined or determinable date 60 only appear to have been prepared in or about the time at which the events they purport to record actually occurred.

It is only after the indignation of the whole world was roused against Germany that the majority of these documents came into existence. It is not difficult under the circumstances for any impartial person to assess the contents of these documents at their real value.

The German reports enlarge on the "numerous acts of aggression," the "traitorous attacks," etc., which are alleged to have imperilled the safety of the German troops, but, says Monsieur Passelecq, they do not deign to furnish figures with regard to the numbers killed or wounded in the alleged guerilla warfare.

Attention is drawn to the fact that Professor A. A. H. Struyken, of the University of Leyden, a recognized authority on International Law, has published a critical examination of the German case in the numbers of *Van Onzen Tijd* for July and August, 1915, and has definitely stated that, in his opinion, the German White Book provides no conclusive proof of the offences alleged and is devoid of value as evidence.

The rigorous method of examination of the German allegations followed in the Belgian reply, by meeting German documentary evidence with Belgian documentary evidence, completely exposes the hollowness of the German case.

This number concludes with five appendices; the first two contain statistical information relating to civilians killed, houses destroyed; a third disposes of the German statement that French troops violated Belgian territory on the 31st July, 1914; the fourth deals with the un-

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successful attempts made to induce the German authorities to permit evidence to be collected to refute the statements relating to guerilla warfare in the German reports; the fifth is the reply of Professor J. Massart, an eminent botanist, to the appeal of the 93 German Intellectuals to the civilized world.

The 103rd number is entitled *La Bataille Marocaine* and contains a very interesting account by Monsieur Ernest Vaffier of the difficulties France met with in establishing her Protectorate in Morocco. The subject is treated in three short chapters, the first of which gives a short history of the events that led up to the situation resulting in the establishment of the French Protectorate, the second chapter deals with events subsequent to the establishment of the Protectorate, whilst the third chapter deals with Morocco and the present War.

Monsieur Vaffier informs us in his opening sentence that all that Morocco has done for France during the present War has been due to General Lyautey. In order to appraise General Lyautey's work in Morocco at its true value, the history of that country from the time that Mouley el Hassan was its Sultan, is briefly sketched.

Morocco was coveted by more than one powerful State in Europe; France and Great Britain were, however, the two principal rivals interested in this territory. They fortunately composed their differences and, in 1904, signed an agreement on the subject. Busybodies at once clumsily and prematurely began to discuss the question of a French Protectorate in Morocco. The immediate consequence was that Germany at once commenced to intrigue in this territory and soon made the Moroccans accomplices in the Franco-German quarrels to which the German intrigues gave rise.

Internal troubles arose in Morocco somewhat later, and the French Government lent its support to Mouley Abd el Aziz, who was soon defeated by his brother, Mouley Hafid; the latter was eventually recognized as Sultan of Morocco by the European Powers. Three prominent events stand out in connection with the ephemeral and unsatisfactory reign of this Shereef who was, it is said, thrown into Germany's arms by French diplomacy:—

(*a*). The case of the deserters at Casablanca, which brought France and Germany within an ace of war; a war only averted by the efforts and patriotism of Monsieur Clemenceau.

(*b*). The Agadir affair, which resulted in the signing of the Franco-German and Franco-Spanish Treaties and in the recognition of the French Protectorate in Morocco, but under conditions not to the liking of France.

(*c*). The massacres at Fez. It was in connection with the massacres of Frenchmen on this occasion that General Lyautey was sent to Morocco.

The Treaty establishing the French Protectorate was signed at Fez on the 30th March, 1912. Mouley Hafid had been giving trouble for some time, so that the French Government had to get rid of him. Mouley Hafid signed his abdication on the 12th August, 1912, and on the day following his brother Mouley Youssef was proclaimed Sultan in his stead; he has proved himself an excellent ruler.

As to General Lyautey's work, Monsieur Vaffier says that his diffi-

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culties were exceedingly great, but owing to his farsightedness and power of organization he soon mastered the situation. In less than six months from his arrival at Casablanca, the rebels had been defeated and pushed back into their own country; the mountain tribes which had been giving trouble had also withdrawn into their own territory, whilst the tribes living in the plains had made their submission. The Shereefian authority, which had been a byword in Mouley Hafid's time, was restored, and the Maghzen was once more able to do real acts of government by administering the tribes, maintaining order, and collecting taxes.

Since the outbreak of the War the local French authorities by the energetic measures adopted have succeeded in keeping the tribes quiet, in spite of the German propaganda work which was on foot in the autumn of 1914.

The part played in the War by Moroccan troops is briefly touched upon in the volume under review; it is too well known to require any detailed reference; whenever they have come into action they have acquitted themselves nobly.

The 104th number contains the official communiqués from the Central Government to the Provincial Civil Authorities—it is the XIX. Volume which deals with this subject. These communiqués cover the period March—April, 1916. The volume is provided with appendices relating to the principal events occurring during the months in question.

The 105th number is entitled *L'Effort de la France*. In a preface to this volume by Monsieur Alfred Croiset, Doyen of the Faculty of Letters in the University of Paris, it is stated that when Germany, in August, 1914, unchained the dogs of war, she felt absolutely certain that before the expiration of the year she would have her rivals in the world lying as dead game at her feet. Everything had been carefully organized, in her appreciation of the situation. No contingency had been overlooked! Beyond a doubt, Great Britain, the Egotistical, would remain neutral, and Italy friendly disposed. Belgium, terrified out of her wits, would allow the immense German Army to pass unopposed through her territories, and in one month after the commencement of hostilities France would be crushed. Germany would then be in a position to turn against Russia, who would at once seek to make peace with her powerful Western neighbour. In a short time all resistance, or thought of resistance, would be over and Germany would tower above everybody and everything. Such is the picture that Monsieur Alfred Croiset draws of Pan-German dreams. We now know to what extent these dreams have been realized. Croiset asks: "How was it that Germany's prodigious preparations came to be paralyzed by resisting forces which she had failed to foresee, and to which she still endeavours to be blind, but which Maximilian Harden and many another recognize to be invincible?"

He answers the question himself: "An effort not less prodigious than her own, if more tardy, nevertheless superior in resources, superior above all in moral force, has come into operation; acting as a counterpoise it has by degrees upset the balance which now tells in favour of right and civilization."

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In the volume under review, an attempt has been made to give in outline the effort made by France to hold her own. Ill-prepared at first to meet Germany's act of aggression, which took her by surprise, France promptly made ready to parry all blows and to thrust back in return. Her army, her navy, her industries have all responded to the call and have put forth all their energy to resist and to conquer.

"In this marvellous counter-attack," says Croiset, "everything is worthy of study and admiration." The mainspring of the great work accomplished has been the unanimous resolve of the Entente Allies to re-establish once more the rule of right and of justice. The *force morale* it is that has created the *force materielle*. The human conscience has revolted at the horrors of the Germanic methods of war. Indignation has been the greater against Germany by reason of the fact that credit had been given her for possessing generous and pacific ideas in this XX. Century; whereas since the outbreak of hostilities all rules which govern the relations of civilized peoples have been broken by Germany. In the track of her army of positive science and of sophisms have been witnessed diabolical acts of barbarism and of pitiless savagery committed by her soldiers. The present War has become a crusade, the object of which is to root out the *Kultur* of Pan-Germanism, poisoned as it is with Cæsarism and militarism, and to substitute in its place the cult of justice and of humanity. It is in this direction that the effort of the Entente Allies tends and this end it will attain.

The contents of the volume are arranged in five sections, with the following titles:—*Les Nations Européenes et la Caserne Germanique* (by Victor Bérard), *L'Effort Moral de la France* (by Gabriel Séailles), *L'Effort Militoire de la France* (by Pierre Dauzet), *L'Effort Industriel de la France* (by Lucien Lévy-Bruhl), *Conclusion* (by Victor Basch).

In the first section Monsieur Bérard points that the present War is something more than the most formidable collision of armies of all time; it is also the conflict between political and moral ideas such as history has not known for at least 23 centuries, that is since the days of Marathon and Thermopylæ. As the Serbs and Belgians of to-day have attempted to do, so did the citizens of ancient Greece when they nerved themselves to resist the expansion of a military *régime* the promoters of which believed it to represent the last word in science, in organization, aye, even in *Kultur*.

Bérard gives an interesting account of the struggles of ancient Greece against the Asiatic barbarians of the V. Century and expresses the opinion that the present struggle between the Germanic peoples and the rest of Europe is exactly similar in all respects. He points out that all the European nations, except the Germans, have, since ages long past, continued to be firmly attached to one idea and one religion, that of individual liberty and of common independence; the Germans have never been willing to give their adhesion to these doctrines. Bérard quotes from the speech made by William II. to the citizens of Görlitz on the 28th November, 1902, when he gave expression to his views regarding the principles which should guide the German people in the following terms:—"In the XX. Century, it will be science, above all technology, which will be the ruling consideration and no longer philo-

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sophy as in the XIX. Century. We must conform to this ideal; it is in scientific research, in the capacity for organization and in discipline that the greatness of Germany lies. Liberty of thought, liberty of science, that's the liberty that I desire the German people to enjoy and that I am willing to grant them—but not the liberty which allows individuals to act haphazard according to their own ways of thinking."

The above statement of the Kaiser appears as a heading to the second volume of the biographical sketch entitled *Tagebuch Kaiser Wilhelms II.*

Bérard points out that to science, and more particularly to technology, unquestionably is largely due the daily welfare of individuals and of nations, but liberty of thought alone, of religion and of science, the dumb liberty of the soul or the deaf liberty of the book were not sufficient to satisfy the ideals of philosophers of old time and cannot be expected to do so to-day; liberty of movement and of action have at all times also been considered essential. He continues: "To the *liberté grecque* and to the *égalité romaine*, Europe, having in the meantime adopted Christianity, became inspired with the desire to add the *devoir de fraternité.*"

The day when, as a result of the French Revolution, the device *Liberté, Égalité, Fraternité* was first cut on the public monuments of France and became a recognized motto throughout Europe, on that day there coalesced, so to speak, the triple teachings of Greece, of Rome and of Christ.

Bérard thinks that the Entente Nations exhibit certain differences in their acceptance of the lessons of the triple teachings in question; Great Britain, more anxious as regards *liberty*, is surprised at the somewhat demagogic passion nourished in France for *equality;* it is in the relations of the Slavs, Serbs and Russians that the Quadruple Entente affords the most complete example of *fraternity*. He continues: "All the nations of Europe, except the Germans, have the same Greco-Roman conceptions of law and right, having lived under the *obédience romaines*, either in the ancient provinces of Western Rome, or in the territories or within the folds of the Church of Byzantine Rome. All have inherited from the two Romes the same ideas and the same opinions, the same instincts regarding the State, and 'tis this that has created the solid unity of the European coalition against the German *Kriegsherr* and his vassals. Although Russians, British, French, Belgians, Italians and Serbs do not live under the same system of polity, nevertheless the British, Belgian and Serbian monarchies, the French Republic and the Russian Czarism are of the same species, sprung from the same Greco-Roman stem.

Referring to Aristotle's definition of man as being a *political animal, i.e.* a being who only develops fully in an urban or civilized community, in fact in the *polis*, Bérard remarks that the peoples of a State are still to-day *political people.* It is towards the Greek *polis* that they still turn as it were towards the source of all their civilization and towards one of the models of one of their policies. The definition of Aristotle retains its full force to-day; the savage and the wild beast live in woods, caves or the desert; the boor and the undomesticated animal only inhabit the wide fields; slaves and degenerate animals live in palaces

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or the domains of their master; but *man* lives in his *polis* and the *German* in his *barracks*.

Bérard gives an extract from the Introduction to Prince von Bülow's work on *German Policy* in which the latter admits that his countrymen do not possess a gift for politics. The Prince describes *political instinct* as the gift to grasp generalities, such that a people suddenly faced with a critical situation are able at once to distinguish between the interests of the nation and those of individuals. Continuing, he states, that the German temperament is such that his countrymen direct their energies first and foremost for the attainment of personal ends and, in consequence, with them matters of public interest come after and take second place.

The Germans form leagues or *Verein* in order to satisfy their tastes or their wants, in order to push their preferences or their ideas. But every *Verein*, Von Bülow tells us, is more or less separatist; every *Verein* is directed instinctively or consciously against the principles of sovereignty and the interests of the public. Even the Unity of Germany proclaimed in the XIX. Century under the baptism of fire at Königgrätz and at Sedan does not amount to a *German Union*, if by a National Union is meant a voluntary grouping of nations into a *Unified State* with full knowledge of the consequences of such an act. The Roman notion of the *res publica* and all this implies does not appeal to the German mind, and, since Europe is to-day almost entirely influenced by the conceptions of Roman law, Germany has become an isolated State in the Old World.

Contrasting the conditions of human society in the Roman State with that in Germany, Bérard points out that in the former there was the plenary power of the State which permitted oppression of the individuals and tyranny directed against their very souls, in the latter, there exists the hierarchic subjection of the men of Germany which permits the enslavement of their bodies and the reduction of their characters to the depths of servility; in the former there was the national duty of obedience and of devotion to the State, in the latter there exists the feudal duty of military service and of fidelity to a Lord Paramount; in the former there existed a free community of people possessing equal rights, in the latter there is obligatory enlistment and conscription. That is to say there is between these two conditions of society the difference between European civilization and German *Kultur*.

In conclusion Croiset states that a Latin brain is quite incapable of either inventing or accepting the definitions of the State, of order, of duty and of right such as those which have been invented by the German brain. The Latin believes in equality of rights for all men in all lands, but the German, after 19 centuries of *Kultur*, still cherishes the notion that there exists a *German right* and a *German duty*, and that even those who are not of the Germanic race are under an obligation to yield their own views on these points in favour of those of the German Interpreter-in-Chief to the Almighty.

The article on *L'Effort Moral de la France* opens with the statement that the world is astonished at all that France has done. She has remained mistress of herself in good fortune and in bad; exercising gene-

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rosity intelligently, she has alleviated suffering by distributing its burden; her genius for improvisation has enabled her to fill up the voids in her military preparations; she has raised and formed armies, learnt war whilst conducting it, mobilized her industry, manufactured thousands of guns, and millions upon millions of projectiles. In connection with the above great works, the results of which are patent to all, there exists a subtle influence which, though invisible, is the motive force: the *effort moral de la France*.

Monsieur Gabriel Séailles asks us not to imagine for a moment that France has undergone some sudden transformation; he proceeds to trace the stages through which his country has reached the ideals which are the mainsprings of the machinery enabling the sons of France to accomplish all that is visible to the eye and audible to the ear. A great part of the moral effort which France has put forth, he tells us, is due to the women of his country; they have set a splendid example, they have done all the good works which lie in their province, and what is more difficult still, they have suffered the direst heart pangs with courageous silence and patient resignation.

"Fifteen months of war found France," says Séailles, "as calm, as firm, as resolved as on the first day of the War." She has shown the necessary confidence in herself which provides proof that she will rise to the heights demanded by her destiny.

Pierre Dauzet, in his article on *L'Effort Militaire de la France*, tells us that in spite of the difficulty of the task, nevertheless it is not impossible even now to give in brief an outline of the magnificent strategy by which the military genius of France managed to save the world from the German obsession. And when, on the termination of the present struggle, the full facts are made known the world will be astonished at the revelation of what the effort of France has accomplished. France with a population of 39 million souls only, a population less than that of either Germany, Austria, Russia or Great Britain, has however had serving in the ranks of her military forces during the past two years numbers equal, if not superior, to those of the other nations named.

In order to hold her own against the mighty forces sent by Germany against her, it became necessary that France should neglect no part of that science of organization in which lies the genius of Germany.

Owing to the secrecy with which Germany had prepared for the War, by providing herself with powerful siege guns, numberless machine guns, and by forming reserve Army Corps, etc., France, at the outbreak of war, found that the preparations she had made for the defence of her territories were quite inadequate. She had great arrears to pull up and Dauzet tells us, in his contribution to this volume, something of the nature of her *effort militaire* to make good the neglect of the past.

The plan for the first concentration of the French Armies, which had been decided upon by the French General Staff on the outbreak of war against Germany, was based on the massing of the main French Army in Lorraine and in the Woëvre; but since it was desired to leave nothing to chance other schemes had also been worked out to meet various contingencies. As soon as the violation of Belgium had taken place, General Joffre took up a waiting position on the banks of the Meuse and of the

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Moselle, ready to launch his army to meet the Germans on whatever line of advance they might finally select.

Dauzet states that the initial German effort surpassed altogether in magnitude all that Germany was credited with being capable of. The sudden mobilization of 70 Army Corps by Germany represented about treble the number of Army Corps which she had maintained in peace. Between August and November, 1914, France had to meet the shock of 52 German Army Corps sent against her (2,100,000 men, about double the force that it was expected the Germans would employ against France, *vide R.E. Journal* for August, 1914, pp. 72 and 85). A French Army of 1,100,000 men, assisted by the Anglo-Belgian forces numbering only some 180,000 men, was alone immediately available to oppose the advanced portion of this highly-organized and well-equipped German Army, consisting of 34 Army Corps; it is not surprising then that the Western Allies did not bring the enemy to a standstill on the unfortified northern frontier of France. Later, French reserves were rapidly mobilized and quickly brought into action; the effort was supreme and within six weeks of the outbreak of the War victory for the first time crowned the French arms.

Dauzet gives, in this article, the dispositions of the French and German Armies during the early days of the War and traces in outline the progress of events leading up to the Battle of the Marne. The importance of the victory on this river line will not be fully appreciated till the history of our era comes to be written by those of a generation who may live in a period more remote from this great event than the present; nevertheless it is already recognized that in the same way that the Battle of Valmy liberated men, the Battle of the Marne has liberated nations.

The increase of the British Army, the preparations of Russia, the entry of the Italians into the War, the outflanking movement which brought the opposing western armies on to the seaboard between Dunkirk and Ostend are briefly touched upon by Dauzet. In conclusion he states: "If France is paying in blood and with the ruins in her land for not having given heed to the haughty hatred of her hereditary enemy, she is henceforth conscious of the terrible dangers through which she has passed; her magnificent and mute sacrifices have already saved her from the tyrannous German yoke; the world seeks to honour her in admiration of her deeds, and she is now bound by an indissoluble pact to her Allies."

"When peace reigns once more over the wide fields on which battles have raged, may the victory, when won, be sufficiently glorious to ensure for ever the preservation of the rights of nations and to avenge the heroic deaths of all who have fallen, be they ever so humble, on the soil of France."

Monsieur Lévy-Bruhl, in the introductory paragraphs to the article contributed by him, states that the longer the War is prolonged the more intense becomes the effort for the industrial organization which is demanded. Formerly, nations when they went to war required but armies and money to prosecute it to a successful issue. To day the Entente Allies have armies, and they have the money, nevertheless there is yet something more they want!

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The experience of the present War has shown that the bravest army in the world, with commanders of the best type, is doomed to disaster if it does not possess as its counterpart an industrial army capable of furnishing it with all the means indispensable for victory.

The subject is dealt with under the two main heads:—1, Organization, and 2, The Results. It is stated that after the Battle of the Marne the gravity of the situation in relation to the supply of munitions to the French Army was borne in on the authorities with full force. It had become evident that the output of ammunition, etc., would have to be on a scale tenfold as great as that the provision of which had been contemplated. In spite of the difficulties presented, this problem was solved; an outline of how this was done, and also statistical information as to the results obtained, is recorded by Lévy-Bruhl in his contribution. He has enabled us to gain some idea of what *l'effort industriel de la France* means.

In the final article entitled *Conclusion* Monsieur Victor Basch tells us that the great effort made by France has been fully appreciated by neutral Powers and more especially by those whose sympathies lean towards France. He particularly examines the attitude of the people in the United States of America towards Germany and France and explains how the former's experience of the peoples of these two nations strikes them. He calls attention to proofs of sympathy for France furnished by individual Americans during the present crisis; proofs which show that the American people are convinced that *l'effort de la France* will carry her successfully through her present ordeals. Basch in conclusion states that it ought now to be apparent even to the adversaries of the Entente Allies that the *effort français* is neither a transitory nor a flickering output of vital energy, but is a durable and permanent effort which will continue until the enemies of France have been definitely brought to their knees. France knows that this victory will cost a heavy price and will be difficult to win. But the whole nation has decided to fight to a finish; the very existence of France, it is recognized, is at stake.

W. A. J. O'MEARA.

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NOTICES OF MAGAZINES.

REVUE MILITAIRE SUISSE.

No. 1.—*January*, 1917.

THE PART PLAYED BY THE FRENCH-SWISS IN THE MILITARY HISTORY OF SWITZERLAND.

The Rôle of the Welches in the National Militia.

The article begun in the number of the *Revue* for December, 1916, is concluded in the number now under review.

"The *Welches* were," says the author of the *Revue* article, "in a general way, an element of progress and a source of emulation in the national army." The organization of the Militia in the days of the old Swiss Confederation was a matter entirely in the hands of the Cantons. In some cases the Cantons altogether neglected their military forces; this was not so in the case of Berne, which at all times kept its troops ready for war. The Vaudois derived advantage from this fact, being thus given an opportunity of displaying their warlike qualities.

A brief account is given of the quarrels of Berne with the Dukes of Savoy, which began about 1562 and ended in 1616. In the former year Berne, Geneva and the Pays du Vaud, alarmed by the attitude of Emmanuel Philibert, Duke of Savoy, put their troops on a war footing; the Duke, in consequence, appealed to the King of Spain for assistance. Although the Duke was compelled by the Treaty of Lausanne (22nd October, 1564) to renounce his pretensions to the Pays du Vaud for ever, yet, in 1590, the Bernese plenipotentiaries, in signing the Treaty of Nyon, were induced to hand back Geneva and the Pays du Vaud to him. This act enraged the Swiss to such an extent that the Council of Berne disavowed the Treaty of Nyon, which was annulled by a vote of the people. The situation again became critical in January, 1611. The then Duke of Savoy, Charles Emmanuel, could not reconcile himself to the loss of the rich lands of the Vaud; he, therefore, put his army in motion on Geneva. Berne at once called out the troops of the *Élite*, occupied the Jura passes and sent a *regiment de secours*, composed largely of Vaudois, to the threatened centre; at the same time, sending word to the Court of France concerning the designs of the Duke on the Pays du Vaud. France ordered Charles Emmanuel to withdraw his troops from the Swiss frontier and at the same time moved her own troops forward; the Duke at once complied with the French demands.

In 1616 a new alarm was raised. A Spanish army assembled in Franche-Comté for the purpose of seizing Savoy, and simultaneously menaced Western Switzerland. The *regiment de secours* referred to above again occupied Geneva and at the same time the Bernese Army was also mobilized. Charles Emmanuel now sought help from Berne and entered into a defensive and offensive alliance whereby this Canton undertook to provide him with three regiments. A large number of

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Vaudois enrolled in these regiments and many of them distinguished themselves whilst serving under the Duke.

During the Thirty Years War, which spread over half Europe, Switzerland managed to remain neutral; nevertheless Swiss regiments were serving during this period with every one of the belligerent armies. In 1620, the Spaniards and Austrians devastated the Valtellina (in the Grisons). Troops furnished by the Zurich and Berne Cantons at once crossed the Alps and marched to the assistance of the *Ligues Grises*; they were defeated by the Spaniards at Tirano, suffering great losses in officers. At the same time Berne also sent troops (one company being provided by Lausanne) to the assistance of Mulhausen, at that time menaced by the Imperialists.

Although at one time the bonds uniting the Cantons became exceedingly weak, yet when the Armies of Turenne and the Swedes approached the Rhine, the Diet reassembled at Wyl, after Swiss territory had been violated, and decided on the adoption of measures for home defence, known as the *Défensional de Wyl*; this being the first federal military organization adopted by Switzerland (1647).

Soon after the signing of the Peace of Westphalia, external dangers having ceased to trouble, internal quarrels broke out in Switzerland; in consequence, for a century and a-half the French-Swiss soldiers played a part only in Civil Wars and in the service of foreigners. This unhappy period is worthy of study on the part of the Swiss; it shows them that internal disorders have in the past been made the pretext by foreign Powers for interfering in Swiss affairs.

When the peasants of Haute-Argovie, Entlibuch and Emmenthall revolted in 1653, the Vaud provided a contingent of 5,000 men and Neuchatel one of 1,200 men, as reinforcements to the Army of General d'Erlach, who soon broke the back of the rebellion. The first Civil War of Wilmergen broke out soon afterwards. The Protestant force which consisted of 8,000 men from the Vaud were surprised and defeated on the 23rd January, 1656, by the Catholics.

At the beginning of the XVIII. Century, the complicated question relating to the *Succession de Neuchatel* nearly provoked a war with Louis XIV. In connection with this situation the French King broke off commercial relations with the Cantons; his cavalry advanced to Huningue and 27 battalions of infantry concentrated at Besançon. Berne and Zurich at once sent forward 5,000 men, 2,000 of whom came from the Vaud, to the frontier of Franche-Comté. In a short time 30,000 Bernese troops, under General de Tscharner, were ready for active operations. At this juncture the reorganization of the Neuchatel Militia was entrusted to officers of the Pays de Vaud; they raised a division 10,000 strong. This demonstration of force was sufficient to prevent war, Louis XIV. being at the time badly in need of all his own troops. The French King therefore withdrew his troops and resumed commercial relations with Switzerland (1707).

During this period 60,000 Swiss soldiers were serving in foreign armies; they took part in the Spanish War of succession. Hœchstett, Ramillies, Oudenarde, and Malplaquet spread the renown of Swiss soldiers throughout Europe; the French-Swiss particularly distinguished themselves on the occasions referred to.

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Internal troubles were, however, not yet at an end; the second Civil War of Wilmergen followed. The Catholics and Protestants of Haute-Argovie again came to blows. The army which was employed in connection with this outbreak at Bremgarten and at Wilmergen (1712) and successfully suppressed this insurrection consisted principally of *Welches*; the Romand battalions behaved with marked gallantry at the Battle of Wilmergen (25th July, 1712) which brought the rebellion to an end.

The Peace of Aarau which followed did not, however, reconcile the factions and, in consequence, the French Ambassador remained Master, so far as his relations with the Diet were concerned. Berne, at this time, alone maintained an attitude of dignity in the *Corps helvétique*. It allied itself to Holland and looked to Great Britain for assistance to shake off the French influence. It maintained its militia as an organized force, one-third of this force consisting of men drawn from the Vaud.

The total numbers from the Vaud who were serving in Bernese regiments in Switzerland, Holland, France and Piedmont amounted to 25,000 men.

The XVIII. Century was a period of peace. The governments of the oligarchic Cantons went to sleep, deceiving themselves regarding the dangers which threatened. The army was neglected, but the military instincts of the Swiss people remained indestructible.

At the end of the XVIII. Century, troubles began to brew in the Cantons, and gave warning of the events which were to hasten the disruption of the former Confederation. On two occasions the national spirit seemed to revive. The news of the massacre of the Swiss Guard at the Tuileries in August, 1792, roused the people to anger. A force from the Pays de Vaud consisting of 14 battalions of infantry, 4 squadrons of cavalry, and 6 batteries of artillery was sent (under General de Muralt) to the Jura frontier. The firm attitude of the Pays du Vaud and of Geneva caused France to withdraw the force she had sent to Carouge.

Six years later, the Revolution in the Vaud opened the road to Berne and into the small Cantons to the armies of the Directory. Many Romand soldiers served in the ranks of the army which at this time fought in the cause of the old Switzerland, which was then expiring.

The invasion of Switzerland and its occupation by foreign troops during the Napoleonic Wars were years of humiliation for her people, and ruined her by exhausting her financial resources. The national army existed at that time on paper only; this was more particularly so from the time of the Act of Mediation, owing to the fact that the great Corsican had swept the men serving in the military forces of the Cantons into the ranks of his Swiss regiments, which were always maintained at full strength. During the period of his supremacy Switzerland provided him with 90,000 recruits, the majority of whom perished in Calabria, in Spain and in Russia.

The partial mobilizations carried out in 1803 and 1809 showed the inadequacy of the Swiss Militia for the needs of the Confederation. A few years later, namely, in December, 1813, when an Austrian Army of 160,000 men advanced on to the Swiss northern frontier, there was only a weak cordon of 20,000 men to oppose them. On the 17th December, the Austrians summoned the Swiss garrison of Basle to hand over the

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bridges over the Rhine. The Government at Berne, wishing to save the town from destruction by bombardment, ordered the troops at Basle to retire inland. The Swiss soldiers much resented this affront; some men of Vaud in their rage destroyed their muskets and, at the same time, the officer charged with the defence of Eglisau refused to obey the humiliating order. The Austrians were in such strength that they pushed aside the weak forces opposed to them and overran the country. However, they handed over Geneva to the Swiss.

During the Hundred Days the Confederation threw over its attitude of neutrality, and in July, 1815, 40,000 Swiss soldiers invaded Franche-Comté; and a combined corps was sent by the Cantons to the Siege of Huningue. The Romands, particularly the men of Vaud, on this occasion again proved their reliability.

The years of peace which followed the Napoleonic Wars provided Switzerland with an opportunity to reorganize her army. But in 1838 the peace of Switzerland was again menaced. In this year a French army of 37,000 men was concentrated on the Swiss frontier, under General Aymard; and other French troops were being assembled at Lyons. Without awaiting the orders of the Diet, Geneva caused her fortifications to be repaired and called up 7,000 men for service. Vaud instantly sent two brigades to the frontier and soon had 20,000 men under arms. The Valois and Friburg followed the example set them. The Diet was in consequence able to show a firm attitude. All the Cantons now rose in arms, and Swiss residing in foreign lands hastened to the aid of their Motherland. Prince Napoleon, then a captain in the Federal Army, proceeded to England and the dangers that threatened Switzerland passed away, Louis Phillip withdrawing his troops.

The German-Swiss showed their appreciation of the results obtained by their French compatriots. Lucerne, Zurich and Schaffhausen sent congratulatory addresses, swords of honour and commemorative medals to their compatriots, the *Welches*, who had proved themselves to be "the guardians of the National Honour."

Stage by stage, the Federal Army made progress and became the corner stone of the national edifice, the earliest of Swiss institutions, "the refuge of Confederate friendship and republican fraternity."

Once again, in 1847, Civil War compromised the stability of the Confederation. The Sonderbund was an unhappy spectacle, but it proved to be the point of departure of a new Switzerland—the Republic of 1848. In this war 180,000 Swiss were engaged on the two sides.

In conclusion, the author of the *Revue* article points out that the *Suisse romande* can, without any vain boasting, claim to have played its part in the military history of the Confederation, and she has every right to be proud of what her sons have done.

Owing to the participation of the *Welches*, as allies and as subjects, in the wars of the heroic epoch of the Leagues, from St. Jacques to Marignan, they possess military traditions in common with the German-Swiss. The uncouth N.C.O.'s, known as *Trüllmeister*, who trained the contingents in the communes in the XVI. Century have inculcated in succeeding generations of Romand soldiers the principles of the rigid elbow-to-elbow drill and of discipline in the ranks. The old Swiss word *Trüll* has passed into the English and German military vocabulary

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under the spelling *Drill*. The *Trüllmeister* of the Swiss Cantons have also been the instructors of German soldiers and of the early French infantry.

The *Welches*, even when serving in Swiss regiments of the French Army, continued to use a German-Swiss dialect, in which dialect all words of command were given. They cherished this privilege so highly that in 1812 when, at a review before Napoleon at the Tuileries of a Swiss Division, a French General attempted to execute a movement by giving the words of command in French, one of the regiments, composed of *Welches*, refused to move, because the words of command were not repeated to them in their customary language—*Schwyzerdütsch*.

Wounds in War.

The *Revue* article is illustrated by reproductions from radiograms and from photographs of injuries suffered during the present War. The article is of more particular interest to the medical profession. The author of the *Revue* article states that previous to the outbreak of the present War the practice of surgery, as it affects armies, was based on the experiences of the Russo-Japanese War and the Balkan Campaigns. It was summed up in two formulæ: antiseptic treatment and temporization.

These principles found their application in the field dressings which were issued to every individual soldier sent to the front. As long as the rifle bullet was responsible for the great majority of casualties the above formulæ met the situation—at the Battle of Liao-Yang 97·90 per cent. of the wounded in the 2nd Japanese Division were hit by rifle bullets and only 2·10 per cent. by artillery projectiles. However, since August, 1914, it has been necessary to modify completely the surgical treatment of wounds; due to the fact that a very large proportion of the casualties have been caused by artillery fire. In the present War 80 per cent. of the wounds have been due to artillery projectiles and only 20 per cent. to rifle bullets. The *Revue* article enters into details of a technical kind relating to wounds of various kinds; this subject-matter does not lend itself to condensation into a short space.

It is pointed out in a short summary that the *Revue* article is only an outline of a big subject. Many volumes on the new surgery relating to wounds have already appeared; and the subject continues to be closely studied by army medical officers with ceaseless attention. In great wars of former times the mortality owing to sickness was from three to ten times as great as that caused by rifle and artillery fire; however, in the Russo-Japanese War the reverse was the case so far as the Japanese were concerned. Nowadays, by the aid of hygiene, many virulent diseases can be successfully combated. The proportion of mental cases has been very large in the present War, but this is not to be wondered at when the intensity of the shocks to the nervous system to which soldiers have had to submit is taken into account.

The Destructive Effect of Projectiles.

I. *Introduction*.—It would be rash, says the writer of the *Revue* article, to form any final judgment on the murderous and destructive effects of projectiles before the present War is brought to an end. Two celebrated sieges, those of Port Arthur and of Adrianople, have afforded

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data for appreciating, to some extent, the results of fire effect against entrenchments and against their defenders. It is agreed that these results cannot be considered as the last word on the subject. To-day, the belligerents have, so to speak, introduced factory practice into war; they have taken advantage of the technical progress in the mechanical and other arts, as is evidenced by the use made of electric means of communication, motor traction, and aircraft.

Motor traction renders possible the use of heavy artillery, and a continuous supply of ammunition thereto, in positions at a distance far removed from railways, and heavy artillery is, in consequence, as effective in the field as the stationary guns of a fortress mounted in cupolas. The accuracy and rapidity of fire of field guns, the intensity of rifle fire, the wide use made of machine guns have each had a decisive influence in bringing about the present condition of trench warfare.

The *offensive à outrance* advocated not long since by the German Great General Staff, and promulgated as a dogma in the majority of military regulations, has had to give place to a defensive-offensive. Siege warfare is the order of the day, and battle manœuvres possess, at the present time, a transient character. The determining cause of this evolution in modern war arises from the improvements introduced in armaments and in explosives. These improvements have led to a notable increase in the efficacy of fire effect, both against living targets as well as against the materials employed in defence.

II. *Remarks on Ballistics.*—A knowledge of ballistics has long been recognized as affording mental equipment of great importance to professional soldiers. The author of the *Revue* article quotes the following extract from the *Traité pratique des tirs Collectifs* of Capt. Collon, of the Belgian Artillery:—"The general theory of the flight of projectiles and a profound knowledge of the properties of their trajectories, considered in relation to the discharge of projectiles singly as well as collectively, and when fired horizontally as also when fired at various angles of elevation or depression, constitute an indispensable basis on which choice should be made of positions either for the offence or the defence." Other eminent writers have expressed the same opinion in somewhat different language.

It was towards the end of the XVI. Century that Galileo established the first equation, in its simplest form, for the fall of a water-jet. He proved that a body to which motion is given in a horizontal plane, if allowed to fall freely in space, describes a parabola whose axis is vertical. The physical properties of gases being unknown at this period, the retardation produced by the air was not taken into consideration by him. Later Newton suggested the law for the correction in respect of the resistance of the medium in which a body might be moving. He stated that the retardation was directly proportional:—(i.), To the transverse section of the body, (ii.), to the square of its velocity, and (iii.) to the density of the medium in which motion was taking place. Corrections made on the above assumptions were found to be correct for velocities above 240 metres per second and below 420 metres per second, and the law was applied accordingly for many years. Euler and Jean Bernouille, of Basle, next took up the study of the subject and prepared the ground for mathematicians of the order of Borda, Gauss, Gauchy,

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and Piobert, who laid the foundations of a new branch of dynamics, that of ballistics.

Approximate equations for the trajectory of moving bodies in vacuo and in air were worked out by the application of the principles of mechanics, and the now well known fact was ascertained that the ascending and descending portions of the path of projectiles were not symmetrical about a vertical axis in the case of their flight in air or other media.

It is pointed out in the *Revue* article that in the case of the ordinary forms of elongated projectiles their longitudinal axis describes, during flight, a cone in space (about a certain point on this axis), and also experiences an oscillatory motion of very short periodicity, *i.e.*, it is subject to precession and to nutation. This complex motion tends to increase the penetrative power of projectiles and diminishes the expenditure of kinetic energy. In the case of a rifle bullet, owing to its relatively small weight, there is a tendency for it to rock or seesaw about its centre of gravity ; an attempt has been made to cure this defect by giving bullets a bi-ogival section instead of a cylindro-ogival section.

The shrapnel bullet, it is said, has a maximum effective range not exceeding 150 metres, measured from the point at which the shell from it was ejected burst. When the shell explodes the bullets cease to be subject, to some extent, to the rotatory motion given to the shell by the rifling of the gun from which it was fired and to the full retardation effect exerted by the air on the shell. It is for this reason that the spherical shape adopted in the first instance for all projectiles has been retained in the case of the shrapnel bullet. The destructive effects of projectiles depend, as is well known, on the initial velocity with which they leave the weapon from which they are fired (or with which they are ejected from an exploded shell), their weight and their shape.

III. *Striking Energy of Bullets and Shell Fragments.*—The invention of colloidal powders has enabled the muzzle velocity of guns and rifles to be increased to such an extent that in recent times the effective ranges of the infantry weapon and of field artillery have been practically doubled. This invention was followed by great improvements of a mechanical order both in the rifle and in artillery pieces and in the projectiles fired from them. The 8-mm. (0·315-in.) French rifle bullet of bi-ogival section has an initial velocity of from 600 to 650 metres per second, and possesses kinetic energy equal to from 300 to 350 kilogramme-metres (approximately 2,170 to 2,530 ft.-pounds) on leaving the muzzle of the rifle. At the ranges at which infantry ordinarily become engaged, the kinetic energy remaining in this bullet is still sufficient to produce serious wounds ; for example, at a range of 800 metres it is 65 to 70 kilogramme-metres (470 to 505 ft.-pounds), whilst at a range of 2,000 metres (remaining velocity about 250 metres per second) it is 20 kilogramme-metres (about 145 ft.-pounds). The *Revue* article contains a tabulated statement giving information regarding the initial velocities, weights of bullet, powder, charge, etc., of the infantry weapons in use in the Swiss, French, and German Armies. Illustrations are also given of various cylindro-ogival and bi-ogival bullets. In a comparison of the destructive effects of rifle bullets and of shrapnel it has generally been considered that the former had the advantage. This arises from

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the fact that the initial velocity of a shrapnel shell is nearly 25 per cent. less than that of the rifle bullet; and further the weight of the shrapnel bullet is, as a rule, some 20 per cent. less than that of the rifle bullet. As the range of field guns is increased from 1 kilometre to 4 kilometres the remaining velocity of the shrapnel shell falls from 420 metres per second to 250 metres per second. The shrapnel bullets of an exploded shell possess kinetic energy equal to 15 kilogramme-metres (about 110 ft.-pounds) at their extreme range; this is sufficient to put a man *hors de combat* (a horse requires the expenditure of double this energy to put it out of action). A tabulated statement provides information regarding initial velocities, weights of shrapnel shell, bullets, etc., in relation to field artillery in use in Switzerland, France, and Germany. —(*To be continued*).

NOTES AND NEWS.

Switzerland.—A special correspondent contributes a few notes of interest relating to affairs in Switzerland. He opens with a brief reference to the Swiss General Staff scandal and others which succeeded it in the year 1916.

It is stated that recent debates in the Federal Chamber, although they could not be expected to satisfy all parties in all respects, have nevertheless created a feeling of confidence and reciprocal goodwill in the majority of the Swiss people, a feeling which did not previously exist. It is said that the Swiss people are stronger and more united to-day than was the case a year ago. Very few changes have taken place in the higher commands of the Swiss Army in recent times; to this fact is it due that the training, etc., of the Swiss Army has proceeded smoothly and methodically. Swiss officers have been allowed to visit both the belligerent fronts, and a number of Commissions of Swiss Medical Officers have been allowed to examine the hospitals and camps for prisoners of war in France and in Germany. There are now some 20,000 sick and wounded soldiers of various nationalities interned in Switzerland. Many of the interned are capable of undertaking some light occupation and of working at a trade.

The dilatoriness of the authorities in dealing with the "affaire Bircher" continues, it is said, to occasion disquietude in the ranks of the officers belonging to the Suisse Romande.

It is suggested that the military authorities are not interesting themselves sufficiently in the matter of the preliminary instruction of recruits. It is urged that this matter should receive serious attention during the current year.

The Central Schools of Instruction for officers which existed before the War were abolished in 1914 and 1915, but were resuscitated in 1916. An innovation is now being introduced by the institution of Divisional Central Schools for the instruction of officers; they will be directly under the control of Divisional Commanders. The German Ambassador at Berne has issued an official denial regarding the rumour afloat that Germany was contemplating the violation of the neutrality of Switzerland.

Portugal.—A special correspondent briefly reviews the military situation in Europe. He points out that, of the small nations of Europe, Switzerland and the Scandinavian countries are the only ones which

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have not been drawn into the whirlpool of war. Will they, he asks, entirely escape being sucked into it? He looks upon the German peace proposals as *contemptible bluff*. Peace will come in its good time, and he hopes that when it does come the small nations will be made entirely free and that a federation of Great Powers will be formed to guarantee their perpetual independence.

Information.

A *résumé* is given of the report relating to second preliminary military course in skiing organized at Chaux-de-Fond in the winter 1915—1916.

A few details are given relating to a proposal regarding the introduction of a Dental Department in the Swiss Army.

This number concludes with a Bibliography.

W. A. J. O'MEARA.

RIVISTA DI ARTIGLIERIA E GENIO.

October, November, and December, 1916.

SUMMARY OF MILITARY OPERATIONS FROM THE 1ST AUGUST TO THE 1ST SEPTEMBER, 1916.

Italian Offensive on the Lower Isonzo.

The preparations for offensive action which led the Italian Army to the storming of the strong place, Goritza, and to the conquest of the defensive system of the Carso were projected during the winter of 1915-16.

At the commencement of the spring, taking into consideration the possibility of an enemy's offensive in Trentino, it was necessary to send detachments of troops and artillery of new formation, which previously were intended for the Isonzo front. In the middle of May that offensive broke out in full violence and it was again necessary to send towards the Trentino a large number of the units of reserves that were available. But, in providing for this, the Italian Supreme Command repeatedly confirmed its orders to the commanders of the armies of the Isonzo to persist in the dispositions for the offensive on that front. The capture of the strong place Goritza, notwithstanding intervening disturbances, remained at all costs the principal objective of the summer operations. In the first half of June in fulfilment of this idea the arrest of the enemy's invasion of Trentino was decided upon. The supreme command caused reconnaissances to be made, to be able at an opportune moment, with rapid movements on interior lines, to bring to the Isonzo and Trentino fronts, troops and guns with all the means necessary for a heavy attack.

The rapidity of the manœuvres, by the railways and autocars, had to be maintained in the greatest possible measure, so as to ensure an initiative action by surprise; or in any case, before the enemy had time to deliver his attack. The offensive against the bridgehead at Goritza had to be preceded by an attack on Montfalcone, lasting two days.

The movements by railway for the collection of the troops and material

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destined for the offensive on the Lower Isonzo were completed in three distinct periods. During the first period from the 29th June to the 27th July, there were preliminary movements consisting of the transport of some reserve units no longer necessary for action on the Trentino. The absolute tranquillity of the execution of these movements was characteristic of this period, which in no way drew the attention of the enemy or revealed the intention of the Italians. During the second period, from the 27th July to the 4th August, the real manœuvres were evolved; these consisted of a very rapid location of artillery and munition, and of the great units and their alignment on the front of the operations. Characteristic also of this period was the very minute accuracy of the preparations, the rapidity of execution, the secrecy of the movements attained by each detachment learning its own destination only during the march. During the third period, from the 4th August, the railway movement was evolved with the greatest regularity and precision.

Capture of the Bridgehead of Goritza.

The strategical object of the operations being established and the plan for the rapid carrying out of the great manœuvres between the Trentino and the Isonzo, the supreme command entrusted to the 3rd Army the arduous and honourable duty of directing the attack along all the front from Sabatino to the sea. The 3rd Army in its turn studied with all possible care the direction of its tactical manœuvres, and the best and most rational employment of the means assigned to it. It was now possible to locate the batteries of artillery in such a manner between the 27th and 31st July, that on the evening of the 3rd August they were ready to open fire.

On the 4th August there took place the action on the Montfalcone sector. After an intense artillery preparation the Italian infantry stormed the heights of the quota 121 east of Rocca, taking 145 prisoners, among whom were 4 officers. But the enemy had placed in the abandoned trenches a great number of bombs which exploded at the moment when the Italians victoriously broke into the trenches, producing the usual asphyxiating gas. Large masses of the enemy's troops were then launched to a counter-attack which compelled the Italian troops, decimated and helpless from the effects of the gas, to retire on the trenches from which they had set out, taking with them the captured prisoners.

The day of the 5th passed with simple artillery actions directed to test the enemy's front and divert his attention; whilst the enemy deceived by the manœuvres of the Italians sent reinforcements of troops and artillery in haste towards the Montfalcone sector.

On the morning of the 6th August between 7 and 8 the artillery opened a violent fire against the enemy's front from Sabatino to St. Michele. During a lull in this formidable bombardment, ardent detachments of infantry were launched against the enemy's lines to ascertain the effects of the fire. At 4 o'clock it was ascertained that the first lines of the enemy's defences were completely destroyed and the successive waves of infantry broke through. The intrepid Italian infantry advancing with indomitable eagerness to the attack of positions which were considered until then to be impregnable was an amazing

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spectacle; while the artillery with wonderful precision seconded their efforts, preceding with curtains of exterminating fire and destroying the reserves massed behind the enemy's positions, and the indefatigable engineers repaired the communication and completed the destruction of the accessory defences and improvising new communications.

On the left wing of the Italian front a column commanded by Colonel Badoglio moved to the assault of the formidable rampart of Mont Sabotino, the key to the defence of Gorizia. Such was the impetus of the troops that overcoming one portion of the enemy's lines, they gained the Quota 609 in 40 minutes, making prisoners of almost all the garrison. The rapid advance proceeded towards the Isonzo and at dusk the Italians had gained the lines S. Valentino, S. Mauro on the eastern slopes of M. Sabotino. On the heights east of Gorizia, a Brigade assaulted north-east of Oslavia, the heights of Quota 188, until now contested with so many sanguinary combats, and after hard and alternating strife succeeded in storming the position. More to the south another Brigade with their first impetus broke through the enemy's strong defences, gained the crest of these heights and reached the Isonzo at Grafenberg. Here, surrounded by preponderating forces of the enemy, they were engaged in a most violent combat during the whole of the night.

At the southern end of the heights, the troops reached the M. Calvario, and in the plain broke through the intricate defensive lines constructed by the enemy on the southern margin of Podgora and the Isonzo. A battle not less obstinate, but otherwise victorious took place on the southern margin of Carso, where the valorous infantry assaulted the strongly fortified lines at the summit of M. St. Michele, another powerful bulwark of the Goritza defences, which for 15 months of warfare had cost the Italians so many valuable lives, and after insistent assaults succeeded in capturing them entirely. Here it is right to declare that the enemy opposed along the whole front a brave and obstinate resistance. Some defended themselves with desperation in caves and isolated pits. They were hunted out in hand-to-hand fights and compelled to surrender.

More than 3,000 prisoners, 10 guns, numerous mitrailleuses and much booty of war material of every kind represented the trophies of this glorious and memorable day.

The Austrian Command, surprised by the unexpected attack of the Italians, but still not despairing of success, sought by every means to restore the situation, and while sending in haste reinforcements to the position they still resisted, they massed troops and artillery in an attempt to repair their losses by desperate counter-attacks.

* * *

The capture of M. Sabotino and M. St. Michele being assured it remained to complete the storming of the important heights west of the city. The sanguinary and incessant battle was protracted until the afternoon of the 8th. The broken and intricate ground, the many powerful lines of defence, the vicinity of Gorizia, a conspicuous centre of the enemy's resources, facilitated their tenacious defence. Step by step, at the cost of large sacrifices, the Italian infantry, with the admirable incessant co-operation of the artillery, acquired the whole of this steep and

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intricate ground, storming one by one the numerous trenches and obliging the defenders to surrender.

In the afternoon of the 8th August, owing to this victorious action, all the heights to the right of the Isonzo constituting the bridgehead of Gorizia, and M. St. Michele on the left of the river were in possession of the Italians. The lines from the Isonzo to the Tolmino Valley were entirely assured to them. Detachments crossed by the Isonzo ford which the enemy had partly damaged, and these were reinforced on the other bank. A column of cavalry and cyclist bersaglieri were launched in pursuit. With great rapidity the detachments of engineers, under fire from the enemy, threw bridges across and repaired the damage caused. On the morning of the 9th August the Italian troops entered Gorizia, while a column of cavalry and cyclists traversed the plain around the city, breaking up the last resistance of the enemy.

The conquest of Gorizia deserves to be enumerated among the finest military operations of Italy. In three days the most important of the enemy's strong places on the Isonzo fell into Italian hands by means of the attack *di viva fozza*, one of the heaviest and most violent attacks on a strong place ever recorded in European warfare. It may be related that on the fortified place Gorizia, Austria had during peace times expended the greatest care, and during the time of Italian neutrality had increased its value with defensive works which the experience of the first months of European war had contributed to render formidable. On the declaration of war the enemy's command had concentrated imposing defensive forces at Gorizia and had made it the chief strategical place.

The enemy's command, as attested by prisoners, was under the illusion that the endeavours to put a stop to the Austrian invasion of Trentino had exhausted the offensive capacity of the Italians, so that their manœuvres on internal lines, conducted with rapidity, precision and secrecy, were able on the morning of the 6th August to permit of their breaking through with extreme violence against an enemy morally unprepared. The efficacious attack on Montfalcone completed the surprise.

The action of the Italian artillery on the 6th August represented a truly classical example of concentration of fire against fortified lines. It was minutely studied and prepared for, and thanks to the exploration of the ground by aeroplanes, patrols, and optical observations, the enemy's positions were perfectly recognized and planned on the map, the targets actually marked, the method of fire established with scrupulous precision, so that at a fixed moment a torrent of steel and of fire was thrown unexpectedly on the enemy's position, overturning the defences, beating down the parapets, destroying the traverses and the observatories and interrupting the communication.

(*To be continued*).

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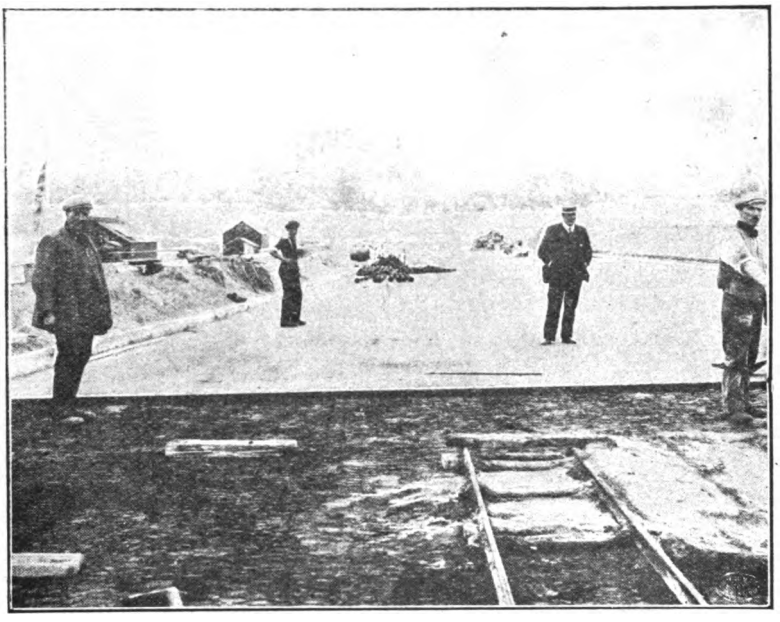

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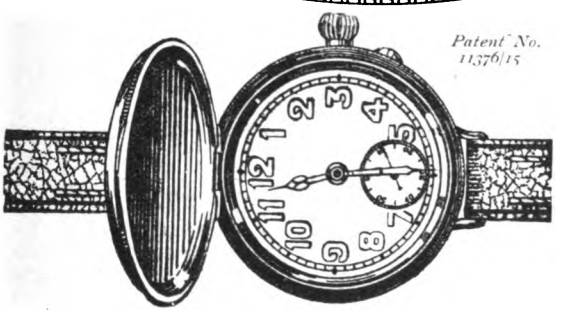

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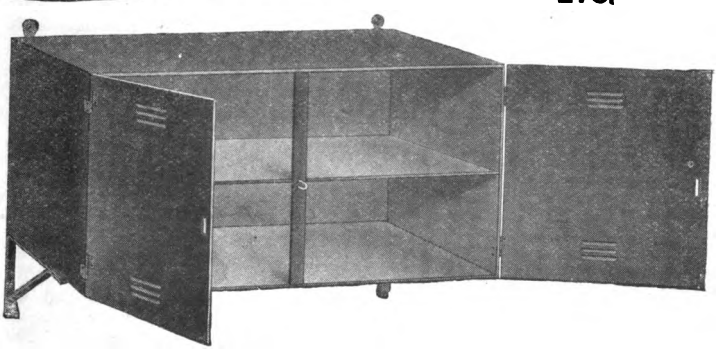

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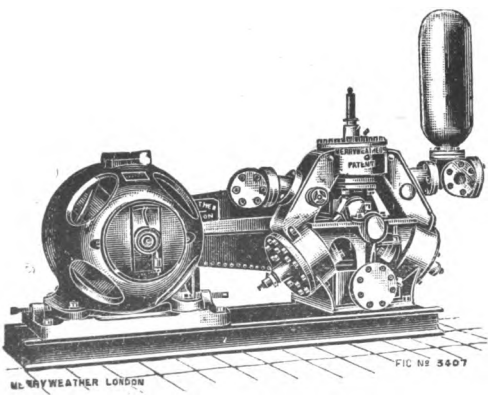

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*DEEDS OF THE ROYAL ENGINEERS.**

(Continued from the April number of the "R.E. Journal").

CHAPTER V.

THE BLOWING IN OF THE KASHMIR GATE AT DELHI.

THE Mutiny of the Sepoy Army in India in 1857 led to a war in which for the first time the officers and men of the Royal Engineers fought side by side with the Engineers of the East India Company's service. The result of the war was the extinction of that great company, and the absorption of its forces, including its Engineers, into the Imperial Army. At the Siege of Delhi—the greatest single feat of arms in the whole campaign—the only Engineers employed were those in the service of the East India Company.

The outbreak of the Mutiny occurred at Meerut on the night of the 10th of May, 1857.

Having first murdered their officers, the rebel soldiery set out for Delhi, about 35 miles distant. On the 12th May they entered the city, where they were joined by the city mob. A massacre of Europeans took place on the same day. A party of twelve officers and ladies escaped from the city and made their way to Meerut, where they arrived in an exhausted and destitute condition.

One of the party was Lieut. Philip Salkeld, of the Bengal Engineers. His cheerfulness and equanimity under these trying circumstances tended much to keep up the spirits of the party.

Steps were at once taken to organize a force for the recapture of Delhi.

General Sir Henry Bernard was told off for the task, and arrived before Delhi and pitched his camp in rear of the ridge on the 8th June.

The force he brought with him consisted of 3,000 European soldiers, some Ghurka and Sikh battalions and 150 men of the Sappers & Miners.

Major Baird Smith, of the Bengal Engineers, was ordered to Delhi in the last week of June to take up the duties of Chief Engineer.

He arrived before Delhi on the 3rd July, and urged the immediate assault of the place.

General Barnard did not concur. He was probably ill at the time for he succumbed to cholera two days afterwards. Major-General Reed who succeeded him was ill when taking over and was obliged

* Compiled in the R.E. Record Office.

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to resign on July 17th. He was succeeded by Brig.-General Archdale Wilson. A retreat was at this time under discussion, and it required all Baird Smith's energy and enthusiasm to sweep away Wilson's doubts and to persuade him, as he wrote to him, "to hold on like grim death until the place is ours."

On the 20th August Lieut. D. C. Home, of the Bengal Engineers, arrived by forced marches of 20 miles a day from the Punjab with a reinforcement of two companies of Muzbi (Sikh) Pioneers.

On the arrival of a siege train on September 5th Baird Smith in consultation with Capt. Alexander Taylor, his second in command, submitted a plan of attack which was approved.

The first siege battery was commenced on the night of September 7th; others rapidly followed until 56 guns opened fire. On the morning of the 14th September the assault was delivered, the points of attack being the Kashmir Bastion, the Water Bastion, the Kashmir Gate, and the Lahore Gate.

The columns of attack were composed as follows:—

No. 1.—Under General Nicholson, 1,000 men, with Lieuts. Lang and Medley, of the Engineers, and Bingham, Assistant Engineer.

No. 2.—Under Brig.-General Jones, 61st Regt., 800 men, with Lieuts. Greathed, Hovenden, and Pemberton, of the Engineers.

No. 3.—Under Colonel Campbell, 52nd Light Infantry, 1,000 men, with Lieuts. Home, Salkeld, and Tandy, of the Engineers.

No. 4.—Under Major Reid, commanding the Sirmoor Battalion, 780 men, with Lieuts. Maunsell and Tennant, of the Engineers.

Reserve under Brig.-General Longfield, 1,200 men, with Lieuts. Ward and Thackeray, of the Engineers.

These columns had all fallen in by 3 o'clock on the morning of September 14th, at the place of rendezvous, Ludlow Castle. During the night the enemy had filled up the breaches with sandbags. It became, therefore, necessary to clear these away by fire from the batteries before any assault could be delivered; the guns opened accordingly, and continued playing till daybreak. It had been arranged that the 60th Rifles, under Colonel Jones, should move forward first of all, and, under cover of the trees and brushwood, creep as close to the ramparts as possible, and from thence keep down the fire of the defenders while the columns advanced. The cheers of this party, when they began to move, were to be the signal for the guns to cease firing.

The main interest as an Engineer operation centred in the blowing in of the Kashmir Gate for the entry of the third column, to which, as has been said, Lieuts. Home, Salkeld, and Tandy were attached. The duty devolved on the two former, assisted by sundry non-commissioned officers of the Bengal Sappers. Cooper gives a very vivid description of the incident, commencing thus:—

"At the head of the third column stood the gallant exploding

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party, consisting of Lieuts. Salkeld and Home, of the Engineers, Sergts. Carmichael, Burgess and Smith, of the Bengal Sappers, Bugler Hawthorn, of the 52nd L.I." (who accompanied the party to sound the advance when the gate was blown in), "and eight native Sappers, under Havildar Madhoo, to carry the bags of powder. At the edge of the cover" (the brushwood which stretched to within a short distance of the ramparts), "the powder bags had been transferred to the European soldiers. Here stood the heroic little band, forming a forlorn hope, feeling themselves doomed to almost certain death, waiting in almost agonized suspense for the appointed signal. It came, the firing suddenly ceased, the cheer of the Rifles rang through the air, out moved Home with four soldiers, each carrying a bag of powder on his head, close behind him came Salkeld, portfire in hand, with four more soldiers similarly laden, while a short distance behind came the storming party, 150 strong, followed up by the main body of the column in rear."

There was a gateway outside the ditch, then the drawbridge, which was so much shattered as to be difficult to cross, and behind it the main gate with a wicket, which at the time was standing open. Home and his party passed over what was left of the bridge, deposited the powder bags against the gate, and dropped unhurt into the ditch, only two or three shots having been fired at them. By the time that Salkeld with his party arrived, the garrison had recovered from their panic, and perceiving how few the assailants were, and what their object was, poured a deadly volley upon the little group at a distance of only 10 ft. Salkeld had by this time laid the other four bags, and was about to apply the port fire when he was shot through the arm and leg. He then handed the port fire to Sergt. Burgess, bidding him light the fuze. Burgess was shot dead before he could obey the order, on which Sergt. Carmichael dashed forward, seized the port fire, and succeeded in igniting the train. The next instant he, too, fell mortally wounded. On this, Sergt. Smith pushed forward, but finding the train already ignited dropped into the ditch, where the bugler had by this time conveyed the wounded Salkeld. Here the party crouched for a few most anxious moments, awaiting the result. This soon declared itself. A terrific explosion was followed by the crashing in of the massive gate, which was shattered to pieces, the gallant little bugler Hawthorne sounded the advance, the stormers with a ringing cheer dashed in, and the Kashmir Gate with the Main Guard behind it was secured.

This now celebrated spot is hallowed by the memory of the heroic deed of September 14th, 1857; and a monument to those who fell on the occasion has been erected on the spot by Lord Napier of Magdala. It was indeed worthy of record. The advance was one to almost certain death. The crowd of mutinous soldiery within could hardly fail to shoot down those who were attempting so daring a deed, and it was a matter of bare justice that the survivors should

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receive the coveted decoration of the Victoria Cross. Salkeld lingered for two days and then died of his wounds, whilst Home, who had passed unscathed through the ordeal, most unfortunately lost his life a very short time afterwards by an accident, whilst blowing up the fort of Malagurh.* Lieut. Tandy, the only remaining Engineer officer attached to the column, was killed during the fighting in Delhi itself after the storming of the Kashmir Gate.

CHAPTER VI.

THE 23RD COMPANY, ROYAL ENGINEERS, IN THE INDIAN MUTINY AND IN CHINA.

THE following account of the doings of the 23rd Company in India and in China from 1857 to 1860 is taken from an account written by the late Lieut.-General Sir Gordon Pritchard, K.C.B., who served as a subaltern in the company during those years.

"In the beginning of the year 1857 war was declared between England and China.

"Lord Elgin was appointed Plenipotentiary, and an expeditionary force was organized.

"The 23rd Company of Royal Engineers, with Capt. Augustus Clerke, Lieuts. Lennox, E. D. Malcolm, and G. D. Pritchard, Assistant Surgeon Henry, and 120 non-commissioned officers and men, with war equipment joined this force.

"The 23rd Company embarked on the 23rd April at Woolwich, on a small sailing ship called *The Captain*. This ship was only just large enough to carry the company, with its escalading ladders, entrenching tools, etc.

"The company, with its equipment, was landed at Singapore on the 25th July, 1857. The Indian Mutiny had broken out on the 10th May, just ten weeks before we reached Singapore. The wildest rumours were afloat, namely, that India had been lost to the British, and that every European in the country had been massacred. Lord Elgin at once decided to send all the troops bound for China to India. The company remained at Singapore until the 1st September, 1857, when, with two batteries of Royal Artillery, it embarked on board H.M.S. *Sanspareil*, commanded by Capt. (afterwards Admiral Sir) Astley Cooper Key, R.N., and steamed for Calcutta, which place was reached on the 18th September, 1857.

"These were the first troops to arrive in India after the Mutiny had occurred. The 23rd Company, R.E., was 'Primus in Indis' of that corps. To our surprise, we found affairs not so bad as had

* Porter's *History of the Corps of Royal Engineers*, Vol. I., pp. 479—481.

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been painted. Calcutta was peaceful, but the native troops had, as a precautionary measure, been disarmed. It was strange to see the native sentries 'shouldering' only a ramrod.

"In the beginning of October the Grenadier Company of the 93rd Highlanders, with the 23rd Company of Royal Engineers, entrained at Calcutta, and after travelling about 100 miles, detrained at Ranigunj. This was the only line of railway then in India. From Ranigunj these two companies proceeded by bullock dak, *i.e.*, in country carts covered with awnings, and drawn by bullocks. During our march we passed the holy city of Benares, and, crossing the River Jumna by a bridge of boats, entered the city of Allahabad.

"A force composed of the Naval Brigade, a few companies of the 23rd and 53rd Regts., some of the Highlanders, and some artillery, with the 23rd Company, R.E., the whole under the command of Colonel Powell, now made rapid marches towards Cawnpore, stopping only for meals and short rests, in the direction of Futtehpore, distant about 60 miles.

"Colonel Powell, on arriving in the vicinity of Futtehpore, ascertained by means of a reconnoitring party that the enemy were entrenched about two miles ahead. He then ordered the 23rd Company to advance in skirmishing order, one half of the company on the right, the other half on the left of the road, supported by the infantry and the Naval Brigade. Entering a plantation of Indian corn higher than our heads, the enemy opened upon us with shrapnel, fired from two of their guns at the other side of the plantation. The rushing of the shot through the Indian corn created a great noise, and one could not see those of our fellows who were struck down. On reaching the other side of the plantation, we saw that Colonel Powell, who had ridden up the road, had been shot dead. Seeing the two guns about 200 yards ahead, Lieut. Lennox ordered the 23rd Company to charge. This was done in gallant style, the gunners being bayoneted at their guns, and the guns captured. The entrenchment was soon afterwards carried, the rebels bolting before our men could get at them with the bayonet. After Colonel Powell was killed, Capt. William Peel, V.C., R.N., of H.M.S. *Shannon*, assumed command.

"The force continued its march to Cawnpore. Here we inspected the house where 230 women and children had been slaughtered, and examined the well into which their bodies had been thrown. This 'Slaughter House' the Royal Engineers demolished.

"The Commander-in-Chief, Sir Colin Campbell, arrived at Cawnpore soon after the above-mentioned force had reached the station. A *tête de pont*, to protect the bridge of boats, made over the river Ganges by Sir Henry Havelock's force, was now completed on the south or Cawnpore side of the river. The 23rd Company, assisted by infantry, performed this work.

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"On the 30th October, 1857, a force, numbering about 4,000 officers and men, crossed a bridge of boats and entered Oudh, which was full of rebels. The Commander-in-Chief was himself in command. The line of direction was due north towards Lucknow, where Outram and Havelock were besieged. After one or two smart skirmishes and the capturing of a few villages, the force arrived at Alum-Bagh, just outside and south of the city of Lucknow, on the 13th November, 1857.

"The first relief of Lucknow had already been carried out by Sir Henry Havelock, who was now himself besieged in the city. At the time of this first relief a small force had been left by him in the Residency, a building just north of the city. Sir Colin Campbell, the Commander-in-Chief, now decided to avoid the native city and to march round its eastern side, resting his right on the River Goomtee and capturing the large buildings on his route. Soon after the capture of the Dilkoosha, an Italian building of beautiful architecture, a civilian named Kavanagh arrived from the Residency, dressed as a native, with a new code of signals arranged by General Outram. The 23rd Company erected a semaphore on the top of the Dilkoosha, and Sir Colin Campbell was now able to communicate with the besieged in the Residency, telling them his line of attack and giving them orders how they were to assist us. On the 15th November we seized the Martiniere College, and crossed the canal on the 16th.

"After capturing a few more fortified posts, our force, led by a battery of artillery, marched through the village on to the open ground between the Secundra-Bagh and the European barracks, from both of which places a heavy fire was brought to bear upon us. Capt. Hardy, of the Royal Artillery, was killed, and numerous N.C.O.'s and men were struck down wounded. A breach was effected by our guns to the right of the gateway of the Secundra-Bagh, at which the Highlanders entered, followed by the men of the 53rd Regt., Sikhs, and Royal Engineers, who rushed and opened the gateway from the inside. Heavy firing occurred between the rebels, who had run into the centre of the compound, and our men. The building in the centre of the garden, which was full of the enemy, was now attacked. The Engineers set the thatched roof on fire. The rebels rushed out and fought like demons, all being speedily bayoneted by our men in a hand-to-hand encounter. Two thousand of the enemy—*i.e.*, all who were in the Secundra-Bagh—were killed. Our loss was about 400.

"Further severe fighting followed, and on the 17th November, whilst the large tomb and observatory fell to the relieving forces under Sir Colin Campbell, the troops of Generals Outram and Havelock seized the Dil-Aram and Funhud Buksh Palaces.

"Both forces now assaulted, from opposite sides, the Palace of Moti-Mahal, on the roof of which the 23rd Company, R.E., planted

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the British flag. Having captured the Palace, the forces met, and the besieged garrison of Lucknow was effectually relieved.

"On the 18th the sick and wounded and women and children left the Residency for the Dilkoosha. This retreat was so well carried out that the mutineers were in total ignorance of our movements.

"The startling news now reached us that General Wyndham had been defeated and Cawnpore captured by the Gwalior contingent, which had come up from the south. The Gwalior contingent consisted of the troops of the Rajah of Gwalior, against whom they had mutinied, the Rajah himself being loyal to the British.

"Leaving a force under Sir James Outram at the Alum Bagh to watch Lucknow, we rapidly marched to Cawnpore, distant 42 miles, pitched our camp at night on the north bank of the river Ganges, placed our batteries in position and shelled the town. We found that Cawnpore was in possession of the enemy, but, fortunately, General Wyndham held the *tête de pont* or bridgehead, and the bridge of boats, which the enemy were trying to destroy by floating down the river tarred barrels and rafts on fire. These the Royal Engineers passed through the bridge or otherwise destroyed. Sir Colin Campbell's force, having crossed the bridge of boats and encamped on the east side of the town of Cawnpore, kept up a heavy fire upon the enemy in the town.

"On the morning of the 6th December General Wyndham opened, from the *tête de pont*, a heavy fire on the enemy's left flank. Sir Colin Campbell threw forward his left and attacked the enemy's right and a general advance was made from the centre. After some skirmishes and bayonet charges the enemy bolted down the Calpee Road towards Bithoor, the residence of the Nana Sahib, who had massacred 230 women and children at Cawnpore. Lieut. Malcolm, R.E., with some men of the 23rd Company, marched to Bithoor and raised some treasure from a well at that place. Thus ended the great Battle of Cawnpore, on the 6th December, 1857.

"After a few days' rest a small force, consisting of the 9th Lancers, a troop of Horse Artillery, the 53rd and 93rd Regts., 4th Sikhs, and 23rd Company, R.E., was despatched to Futtehgarh, where it was said women had been blown away from guns and children placed as targets for the rebels to fire at.

"On the 1st January, 1858, the force crossed the Kala Nudee, the enemy firing upon the bridge the whole time. The 53rd Regt. advanced in skirmishing order, supported by the Highlanders, and captured the village. On the next day the force reached Furruckabad, the Rajah of which place was hanged from a tree, he, like the Nana Sahib, having been guilty of some brutal murders of British residents. His fort was afterwards destroyed by mines laid and fired by the 23rd Company. The troops then returned to Cawnpore, where a considerable force, including a siege train, had collected.

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Lieut. (afterwards General Sir) Richard Harrison, R.E., here joined the 23rd Company.

"In the beginning of February, 1858, Sir Colin Campbell, having sufficient troops to capture Lucknow, again crossed the river Ganges by the old bridge of boats, fought an action at Meangunj, and reached General Sir James Outram's entrenched camp near the Alum Bagh on the 2nd day of March, 1858.

"The Dilkoosha was again captured, and a battery made by the 23rd Company in front of it to breach the Martiniere. Half the 23rd Company was employed on this duty. The other half, together with the 4th Company, R.E., the whole being under the command of Major (afterwards General Sir) Lothian Nicholson, R.E., constructed a bridge of casks across the river Goomtee, close to the Dilkoosha. General Outram and his force crossed the bridge of casks to the north side of the river. Major Nicholson and the 4th Company, R.E., were placed under General Outram's orders. Capt. Peel's naval guns took up their position in the battery before mentioned, and shelled the Martiniere. General Outram, after one or two engagements, reached a position on the north side of the Goomtee. The 23rd Company advanced by means of sapping to the Chota Imam Bara and the Begum Kothi. All this time the Ghurkhas—who remained loyal throughout the Mutiny—were steadily advancing through the native city. The Kaiser Bagh, of quadrangular form, was seized by the Commander-in-Chief's troops. The 23rd Company, with a party of infantry, cleared this palace, room by room, bayoneting the rebels therein.

"On the 17th March the Shrugood-Dowlah compound was captured, and Shrugood-Dowlah killed. This compound was full of powder carts containing boxes of powder, and large quantities were lying about. Capt. Augustus Clerke, R.E., with the 23rd Company, and Capt. Brownlow, of the Bengal Engineers, some Highlanders and Sikhs, were ordered to destroy this powder. They commenced throwing the boxes down the well in the centre of the compound. The well suddenly exploded, and all the powder in the place became ignited and caused a terrific explosion. The two Engineer officers were mortally wounded, and about 100 of the soldiers—Highlanders, Sikhs, and Sappers—were killed. Capts. Clerke and Brownlow, with 13 men of the 23rd Company, were buried in one grave, their bodies being sewn up in their greatcoats. The last fight of the Siege of Lucknow took place on the 19th March, 1858, when the Moosa Bagh was captured.

"After a short rest General Walpole was sent with a well-organized force to the Rohilcund district, situated in the west of the province of Oudh, to capture the fort of Rooya, held by Nurput Singh. Owing to the oppressive heat, this march was very trying. Consequently the troops proceeded only by night.

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"On the 15th April, when nearing Rooya, a heavy fusillade was directed against our force, which spurred us on to the attack. On reaching the ditch of the fort, about 7 p.m., the General caused the 'retreat' to be sounded. The enemy, knowing our bugle-calls too well, returned to the parapets, which they were leaving, and killed more of our men as we were retreating than when we were advancing. Brig.-General Sir Adrian Hope, coming up to command the retreat, was shot through the neck and instantly killed. Our camp was pitched that night 2 miles to the rear.

"The next morning the fort was reconnoitred, and found to be open at the back. It was deserted, the enemy having bolted during the night. This fort was blown up by the Engineers. We then left the place and marched to Shahjehanpur, where we left a garrison, and proceeded thence to Bareilly. On approaching this city, numbers of ghazies, or native fanatics, intoxicated with 'bhang,' rushed out, and, attacking the 42nd Highlanders, pulled its commander, Colonel Cameron, off his horse, and would have speedily killed him had they not been bayoneted by the men of the Grenadier Company of that distinguished regiment. The British troops advanced and captured the city. The heat was now so intense that more men died from sunstroke than from the bullets of the rebels. The 23rd Company was now ordered to Roorkee to recruit its health.

"On the 8th November, 1858, for the fourth time, the British troops crossed the river Ganges at Allahabad, captured the fort of Amithee, and then marched to the plain of Doundeheira where they fought a battle with the rebels under Bani Hadhu, and drove them into the river. Forts Oomreah and Musjeedia were assaulted and captured.

"On the last day of the year 1858, whilst eating our cooked rations, about 6 p.m., orders were issued that the troops were to start at once (8 p.m.), officers mounted, N.C.O.'s and men on elephants in the direction of Nepaul. The troops marched all night. At daybreak on reaching the river Raptee, which separates the British possessions from those of Nepaul, the Ghurka country, we sighted the camp of the Nana Sahib, which was situated on our side of the river. We at once attacked. All his followers fled, crossing by a ford, the Nana Sahib leading them. The 7th Hussars gallantly charged into the river, sabring them in mid-stream. This brilliant action, fought on the last day of the year 1858, may be considered as the last fight in the suppression of the Indian Mutiny. Only a few small skirmishes took place afterwards. The 23rd Company returned to Lucknow and were quartered at the Mousa Bagh."

The following is the inscription on the memorial tablet erected in the Garrison Chapel at Chatham to the memory of the officers, N.C.O.'s and men who lost their lives during the Mutiny:—

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SACRED

TO THE MEMORY OF

The Officers, Non-Commissioned Officers and Sappers
of the 23rd Company of Royal Engineers,
who fell in action, or died of Wounds or Disease
while serving in the Indian Campaigns of 1857 and 1858.

AT THE BATTLE OF KHAJWA.

Sapper John Malcolm, 1st November, 1857.

AT THE RELIEF OF LUCKNOW.

Lce.-Cpl. Alfred Germany, 17th November, 1857.
Col.-Serjt. Philip Morant, 18th Nov., 1857.
Sapper Thomas Thoms, 24th Nov., 1857.
2nd Cpl. Peter Duff, 23rd Jan., 1858.

AT THE SIEGE OF LUCKNOW.

Capt. Augustus J. Clerke, 17th Mar., 1858.
Sapper J. Bunting, 17th Mar., 1858.
Sappers Geo. Beer, Michael Daily.
Lce.-Cpl. J. Davis, 17th Mar., 1858.
Sapper Andrew Fairservice, Mar., 1858.
Sapper David Northwood, 17th Mar., 1858.
Sapper William Outerson, Mar., 1858.
Sapper William Robinson, 17th Mar., 1858.
Sappers Alfred Smith, Chas. Tucker.
Lce.-Cpl. James Slade, 17th Mar., 1858.
Sapper John Yeo, 17th ,, ,,
Sapper John Ford, 18th ,, ,,
Cpl. Fredk. Morgan, 23rd ,, ,,
Sapper Edward Swanton, 11th Sept., 1858.

AT THE BATTLE OF BAREILLY.

Sapper Charles Reynolds, 5th May, 1858.
2nd Cpl. Joseph Wren, 5th May, 1858.

DIED OF DISEASE.

Sapper Thomas Hancock, 26th Sept., 1857.
,, Andrew Tait, 27th ,, ,,
,, Jas. Benford, 8th Oct., 1857.
,, G. Singleton, 23rd Mar., 1858.
,, T. J. Clyma, 23rd Apl., 1858.
Sapper William J. Harris, 8th May, 1858.
2nd Cpl. James Fletcher, 11th ,, ,,
Lce.-Cpl. Alex. J. Neelance, 18th ,, ,,
Sapper Richd. Robinson, 24th ,, ,,
Lce.-Cpl. J. Colman, 15th June, 1858.
Sapper Thomas Wyndeatt, 15th June, 1858.
,, David Nicholson, 21st ,, 1858.
Bugler John Noyes, 5th July, 1858.
Lce.-Cpl. John Yolland, 30th Sept., 1858.

Erected by the Officers and Men
of the 23rd Company of Royal Engineers,
1860.

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In January, 1859, Capt. Gerald Graham, V.C.,* reported himself for duty at Lucknow, and took over the command of the 23rd Company. Graham had been awarded the Victoria Cross for "determined gallantry at the head of a ladder party at the assault of the Redan on the 18th June, 1855, and for devoted heroism in sallying out of the trenches on numerous occasions and bringing in wounded officers amd men."

On the 22nd October, 1859, Graham was gazetted a brevet major for his Crimean services, and on the 25th of the same month he left India with his company for China, arriving at Canton in November.†

Before the outbreak of the Indian Mutiny in May, 1857, British relations with China were in a strained condition, and the troops destined for an expedition against that country had—as already described—been stopped at Singapore on their way out, and hurried to Calcutta. Since then much had happened, and Canton was now occupied by British troops. In this expedition the French were our allies.

The following account of the doings of the 23rd Company in the China War of 1860 has been kindly supplied by Lieut.-General Sir Gordon Pritchard, K.C.B. :—

"The company, under the command of Major Gerald Graham, V.C., with Lieuts. Malcolm, Pritchard, and Harrison, proceeded by train from Cawnpore to Calcutta, embarked on board Messrs. Jardine & Co.'s opium steamer, *The Lightning*, and proceeded to Hong Kong, *viâ* Singapore. On reaching Hong Kong, the company was transhipped into a river steamer, which carried them to Canton, where they were quartered for the winter. During the winter the Sappers were employed in ordinary barrack repairs. Later the company embarked and steamed for Talienwan Bay, where they joined the 2nd Division, under Sir Robert Napier, and were encamped on one side of the bay. The 1st Division, under General Sir John Michell, encamped on the other side of the bay. Lieut.-Colonel Fisher, R.E., was invalided home, and Lieut. Pritchard took command, and joined the 1st Division.

"The 2nd Division, under Sir Robert Napier, who was an Engineer officer, having landed at Pehtang, came up and advanced to attack the north Taku Fort, on the Peiho River, the 1st Division forming the reserve. The 23rd Company was with the 2nd Division.

"On the evening of the 19th August, before the assault, Sir Robert Napier sent for me and ordered me to command the ladder party for the assault. Batteries were completed, and guns placed therein. The north fort was shelled during the night.

"In the early morning the 23rd Company and Madras Sappers

* Afterwards Lieut.-General Sir Gerald Graham, V.C., G.C.B.

† *Life and Letters of Lieut.-General Sir Gerald Graham, V.C., G.C.B.*, Colonel R. H. Vetch, C.B., p. 141.

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paraded in front of the supports, ready to move forward and keep pace with the progress of the attack.

"We had formed ladder bridges with which to cross the wet ditches in front of the fort. These ladder bridges consisted of escalading ladders joined together and mounted on wheels. We also carried some bamboo ladders with which to escalade the fort.

"The attack commenced soon after 6 a.m.

"The English pontoon bridge, carried by a party of Royal Marines, was met by so heavy a fire that half the carriers were immediately disabled, and the construction of the bridge rendered impracticable. Major Graham was wounded in attempting to carry out this duty.

"Sir Robert Napier then asked if I could cross the ditches with escalading ladders alone. On my answering in the affirmative my party proceeded to the fort under a heavy fire. I placed the ladders across the wet ditches. The Sappers, jumping into the bottom of the ditch, supported the ladders in the centre by holding their hands over their heads. The men were up to their armpits in water. Then, with our bamboo ladders, we ran along the rounds of the escalading ladders, crossed the ditch and escaladed the fort. Sir Robert Napier afterwards said to me: "Well done, Pritchard! This is the first time I have seen a bridge with living piers." The French on the right succeeded in crossing the ditches by means of their ladder bridges, and effected a lodgment on the berm of the fort. On reaching the top of the parapet hand-to-hand fighting occurred between the Chinese and British and French soldiers. After a vigorous resistance, the enemy bolted across the terreplein of the fort and were shot down by the French and by our troops. At 8.30 a.m. this fort, the key of the whole position, was in our hands. Soon afterwards the surrender of the remaining northern forts and the abandonment of those on the south side was complete.

"The following extracts from the despatches of Major-General Sir Robert Napier, K.C.B., refer to the doings of the 23rd Company in the assault on the Taku Fort:—

TANG KOO, *August 26th*, 1860.

SIR,—Having received the sanction of the Commander-in-Chief to commence operations against the fort, I advanced on the evening of the 19th a strong piquet composed as per margin* to the border of the series of canals which surrounds the enemy's position. The Engineers, under the direction of Lieut.-Colonel Mann, R.E., immediately commenced passages across the broad canals to my front and left.

* * * * *

During the night of the 20th the batteries were completed by the Royal Engineers Department, and the remaining canals in my front were bridged so as to give access to the ground, and convert them into valuable cover.

* * * * *

* Milward's Battery, R.A., Madras Mountain Train Battery, 23rd Company, Madras Sappers, 67th Regiment.

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At 4 a.m. my column of infantry moved into position . . . the Royal Engineers and Sappers, with materials, were placed under cover in front of the supports.

* * * * *

The passage of the ditch by means of ladders was carried out by Lieut. Pritchard, R.E., and parties of our infantry, effecting the passage of the ditches, some by means of the ladders, and others by swimming, made their way to the gate.

* * * * *

To Lieut.-Colonel Mann, Chief Engineer, and the officers and men of the Engineer Brigade, I feel grateful for the unwearied exertions by which they have carried the construction of necessary works of approach and attack to a successful issue.

* * * * *

I append a list of officers and men whom I would earnestly recommend to the protection of His Excellency the Commander-in-Chief.

List of Officers and Men Entitled to Honourable Mention for Services Rendered in the Attack of the Peiho Forts, 21st August, 1866.

Royal Engineers.—Major G. Graham, V.C., commanding 23rd Company. Recommended by Colonel Mann for his gallant conduct in trying to establish the pontoon bridge under a heavy fire, by which he was severely wounded.

* * * * *

Lieut. G. D. Pritchard.—Gallant conduct in taking up ladders and bridging the ditch under a heavy fire.

After the capture of the Taku Forts, the 1st Division took the lead, the 2nd Division being in reserve. We marched in this order up to Tien Tsin.

The 2nd Division now advanced to the front, under the command of General Sir Robert Napier, who was ordered to capture Pekin. A garden was seized a few hundred yards from the wall of Pekin. A party of the 23rd Company crossed a small stream and painted a white patch on the spot that was to be breached. A battery was made in the garden and guns placed therein, after which an ultimatum was sent into Pekin that if they did not open the gates by noon on a certain date the wall would be breached. Just before noon the gates were opened, and the city of Pekin, the capital of China, was in possession of the British. On the following Sunday news arrived that our French allies had captured the summer palace, situated some miles to the north. The Emperor of China had fled to the mountains to the north. At this juncture Lord Elgin ordered the Summer Palace to be burnt to the ground and the news to be conveyed to the Emperor of China, in order to bring him to terms. Soon afterwards Prince Kunj, the Emperor's brother, came down to Pekin and signed the treaty in the palace inside the capital. This was a gorgeous ceremony. The British troops, in full uniform, marched to the palace to be present at the ratification of the Treaty.

The troops returned to Tien Tsin, and, for their accommodation, I was ordered to seize the Mandarins' houses. Having completed this work, the 23rd Company was ordered to return to England. The company, with Major Graham in command, and Lieuts.

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Malcolm, Pritchard, and Harrison, embarked on board Her Majesty's troopship *Adventure* and steamed for England, arriving on the 25th May, 1861."

A characteristic anecdote of Gerald Graham—who commanded the 23rd Company throughout the campaign—is given by Lord Wolseley, in an article entitled "Courage," contributed by him to the *Fortnightly Review*, of August, 1888 :—

"I have heard it said that small men are generally braver than tall men, but one of the most stolidly and immovable brave men I have ever known is several inches over 6 ft. in height. I have often seen him, from pure laziness, when relieved from duty in the advanced trenches before Sebastopol, step out calmly in rear of the parallel where he happened at the moment to be, and take a bee-line for camp, exposed for many hundred yards to a heavy rifle fire from the advanced works of the Russians. He might have walked home through the trenches in safety, but he was too lazy or too careless of his life to go so far round. I remember a curious instance of his imperturbability some years afterwards, when I met him in China. In the assault of the Taku Forts we had to cross two ditches filled with water. One of these was sufficiently wide and deep to require a bridge to be thrown over it. In carrying up a light-infantry pontoon bridge to launch into this ditch, a round shot went through one of the pontoons. To launch it in that condition would have caused it to sink and we had great difficulty in getting the injured pontoon out of the bridge under the close severe fire to which we were exposed from the works behind the ditch. In common with all the other mounted officers, I had left my horse at a safe distance behind under some cover. I was therefore astonished when, upon standing up after working at this little bridge on the ground, to see beside me a very tall man on a tall horse. The position was actually comical, and as well as I remember, I laughed as I saw my cool friend there at the edge of the ditch, a regular cockshot for every Chinaman near him. He said something to me which, owing to the great din and noise at the moment, I could not hear, so moving nearer to him I carelessly put my hand on his leg. He winced a little as I touched him, and calmly saying 'Don't put your hand on my leg, for I have just had a bullet in there," went on with his conversation as if only a mosquito had bitten him. That man is now known to all as Lieut.-General Sir Gerald Graham, v.c., who commanded a brigade at Tel-el-Kebir, and who was afterwards in chief command at El-Teb and the many other bloody engagements which took place near Suakim."

An interesting account of the campaign, including an account of the sack of the Summer Palace, will be found in Sir Richard Harrison's *Recollections of a Life in the British Army*.

A magnificent carved throne was taken from the throne room of the Summer Palace by the 8th Company, R.E., under the command of Capt. C. G. Gordon—afterwards known to fame as Chinese Gordon—and by him handed over to the 23rd Company, by whom it was brought back to England and deposited in the Royal Engineer Headquarter Mess at Chatham.

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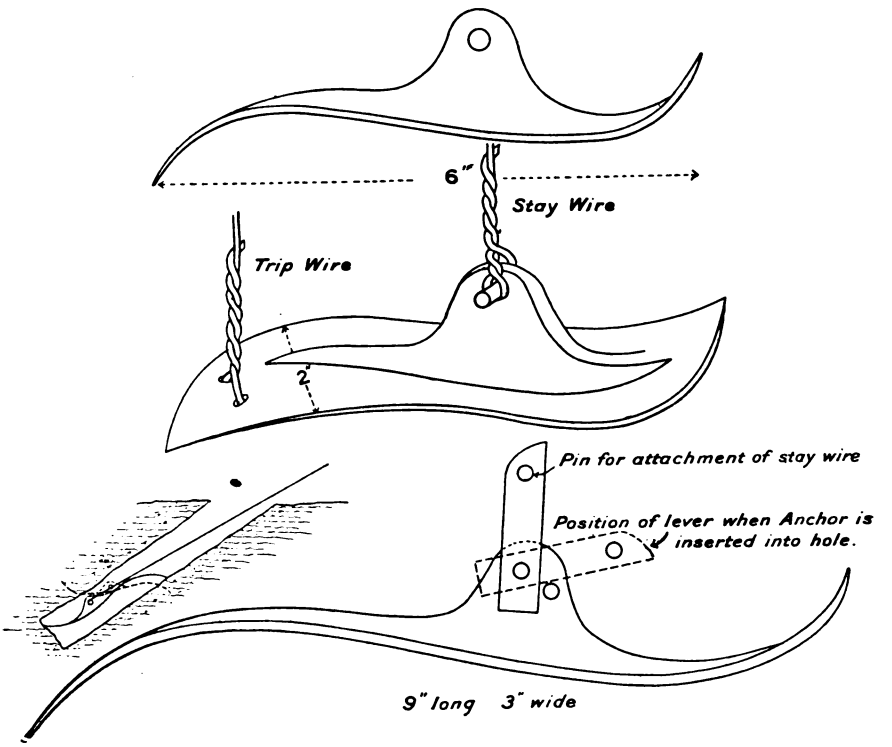
A USEFUL ANCHOR.

By LIEUT.-COLONEL BERTRAM A. G. SHELLEY, R.E.

THE accompanying sketches show an anchor which can be used either for holding revetments, for staying light telegraph poles or in lieu of pegs for the storm guys of hospital marquees, etc. If used for revetments only one wire, the stay wire, would be required, but if intended to subsequently recover the anchor the second or trip wire is needed.



To use the anchor it is necessary to bore a hole in the ground with an earth augur and to push the anchor to the bottom of the hole short end first. Immediately a strain is put on to the stay wire the points of the anchor bite into the sides of the bore hole and it eventually assumes a position across the hole. To recover the anchor the stay wire is first slackened, and, with an iron rod or piece of piping,

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passed down the hole. Three or four smart blows are given to the anchor so as to drive it back. This causes a cavity in the ground above the flakes, and a subsequent pull on the trip wire causes the flakes to re-enter the bore hole, and the anchor can be pulled out.

The smaller sized anchor, buried 14 in. in clay, required three men using a tackle consisting of a single and double block to pull it out. The larger anchor under similar conditions withstood five men using two treble blocks.

It was found that unless the pin was used for attaching the stay wire to the anchor the sharp edges of the hole in the latter cut through the wire.

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EARTH CONNECTIONS IN WIRELESS TELEGRAPHY.

By CAPT. R. CHENEVIX-TRENCH, M.C., R.E.

I. WHILE it is well known that it is desirable to have a good earth connection for any wireless aerial, the actual effect of this connection on the efficiency of transmission and reception is not so generally recognized, and in consequence its very great practical importance is sometimes underestimated. The question of the general effect of the earth connection in sending and receiving is considered in the following article :—

II. *Sending* :—

(1). In sending, whatever type of apparatus is used, the energy developed in the aerial is expended in two ways :—

(*a*). In radiation, or useful work.

(*b*). In overcoming ohmic resistance of aerial conductors and earth connections, and in inducing currents in the surrounding earth and in neighbouring conducting bodies. All this is wasted work and contributes nothing to radiation. Generally by far the greatest losses under this head are those due to earth resistance. The proportion of energy radiated to the total energy developed in the aerial is the radiation efficiency of the aerial.

Let P be the amount of energy per second developed in an aerial, in watts ; P_r the amount radiated per second, and P_e the amount wasted through the various sources given above under heading (*b*). Then $P=P_r+P_e$ and the radiation efficiency of the aerial is

$$\frac{P_r}{P_r+P_e}.$$

If I is the current near the foot of the aerial in amperes and R_r is the resistance due to radiation, in ohms, then

$$P_r=I^2R_r. \quad *$$

Also if R_e is the resistance due to all the causes under heading (*b*) in ohms, then

$$P_e=I^2R_e, \quad *$$

* The general practice is here followed of taking the radiation resistance R_r as that quantity which, when multiplied by the square of the R.M.S. current at the base of the aerial, gives the total power radiated. In order to conform to this resistance rating the "wasting" resistance, R_e, is here taken as that quantity which gives the total power dissipated through all other sources when multiplied by the square of the R.M.S. current at the base of the aerial.

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so that the radiation efficiency may be shown as $\frac{R_r}{R_r+R_e}$. This shows clearly the great importance of keeping the value of R from all sources as low as possible; for while the aerial ammeter might show an apparently satisfactory reading, yet if R_r were small compared to R_e only a small proportion of the power developed in the aerial would be usefully expended in radiation.

L. W. Austin states that the radiation efficiency may be as high as 50 per cent., in which case R_e is equal to R_r. As this is about the highest efficiency that may be looked for in practice, we may assume that it is only reached with a very good earth (upon which the value of R_e chiefly depends) and with an aerial radiating on its most efficient wave length. This is usually about 1·5 times the natural wave length. With a bad earth connection R_e will be much greater than R_r even at the most efficient wave length, and if, for example, $R_e=5R_r$, as may easily be the case if great care is not taken, the radiation efficiency is only 17 per cent.

The values of the radiation resistance, R_r, and the total resistance, R_r+R_e, of an aerial may be arrived at by the methods given below.

(2). *Radiation Resistance.*—It has been shown* that the power radiated by a hertzian oscillator or dipole is given by the formula

$$P_r=790\frac{l^2}{\lambda^2}I^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1),$$

where P_r is the power radiated, in watts,
l is the length from pole to pole, and
λ is the wave length, in any like units.
I is the R.M.S. current in amperes.

That is, the radiation resistance in ohms is $790\frac{l^2}{\lambda^2}$.

An earthed aerial can be considered as the top half of a hertzian oscillator of which the bottom half is formed by the "reflection" of the aerial, and in this case l is twice the height from the ground to the centre of capacity of the aerial system; we will call this the effective height, h, of the aerial, so that $l=2h$. In the case of an aerial only the top half of the dipole radiates energy and the values of P_r and R_r obtained from the dipole formula must be multiplied by ·5, so that we have

$$R_r=\cdot5\times790\frac{(2h)^2}{\lambda^2}$$

$$=1580\frac{h^2}{\lambda^2}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2),$$

where h is in the same units as λ.

* Hertz; Lodge.

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Owing to the distributed capacity of the vertical part of any aerial the effective height is always less than the actual height, which we will call H. In a simple vertical aerial the value of h is about ·4H, though a large tuning coil will reduce this somewhat. In any form of aerial with a very large elevated area the effective height will be practically equal to the actual height. Between these limits the effective height may be arrived at with sufficient accuracy for practical purposes by the following method :—

Let T be the ratio $\frac{\text{Capacity of horizontal part of aerial}}{\text{Capacity of vertical part of aerial}}$.

Then if the vertical part consists of a single wire or of parallel wires its capacity may be taken as acting at a height ·4H, and we must find the centre of effect of T units acting at a height H and 1 unit acting at a height ·4H ; this is given by the formula

$$h = H\left(\cdot 4 + \cdot 6\,\frac{T}{T+1}\right) \qquad \ldots\ldots\ldots\ldots\ldots\ldots (3).$$

If the vertical part opens fanwise to a wide roof area, its capacity will act at a greater height than ·4H and the following formula is more nearly applicable :—

$$h = H\left(\cdot 6 + \cdot 4\,\frac{T}{T+1}\right) \qquad \ldots\ldots\ldots\ldots\ldots\ldots (4).$$

In a single wire aerial, or any aerial in which the number and spacing of the vertical and horizontal wires is similar, the vertical part will average a slightly greater capacity per unit length than the horizontal part, owing to its proximity to earth, but the difference is small and for our purposes T may be taken as the actual proportion of the length to the height of the aerial. Where the vertical wires are fewer or at a smaller interval in proportion to their length than the horizontal wires, T will be greater than this proportion of length to height.

Example.—Let us consider for example the radiation resistance of a 2-wire aerial of T shape ; height, 40 m. ; length, 80 m. ; wave length, 600 m.

Here T=2 approximately.

$$\therefore \quad h = 40\,(\cdot 4 + \cdot 6 \times \tfrac{2}{3})\ \text{m.}$$
$$= 32\ \text{m.}$$
$$\therefore \quad R_r = 1580 \times \frac{32^2}{600^2}\ \text{ohms}$$
$$= 4{\cdot}5\ \text{ohms.}$$

That is to say, if a current of 10 amperes were developed at the foot of this aerial, the power radiated would be given by

$$P_r = I^2 R_r$$
$$= 450\ \text{watts.}$$

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(3). *Total Resistance.*—The total resistance in ohms, R, or R_r+R_e, of any oscillating circuit is given by the formula

$$R=\delta f L \quad {}^{(1)} \ldots\ldots\ldots\ldots\ldots\ldots (5),$$

where δ is the logarithmic decrement per period of the oscillating circuit.

f is the frequency.

L is the inductance in henries.

The value of δ for an aerial may be most easily found by the method due to Bjerknes and Drude. Oscillations are produced in the aerial by means of a spark coil and are induced into a calibrated wave-meter of which the high-frequency resistance is known and which is fitted with a galvanometer.

The coupling between the aerial and the wave-meter should be as loose as possible and the latter tuned to the aerial wave length by obtaining maximum current in the galvanometer. This maximum current is noted, the wave-meter put slightly out of tune and the galvanometer reading taken again.

Then if δ is the logarithmic decrement per period of aerial,

δ_1 is the logarithmic decrement per period of wave-meter,

λ_m is the wave length of wave-meter when in tune with the aerial,

λ is the wave length when slightly out of tune,

A_m is the current in galvanometer of wave-meter when in tune with aerial,

A is the current when slightly out of tune,

we have

$$\delta+\delta_1=2\pi\frac{\lambda_m-\lambda}{\lambda_m}\sqrt{\frac{A^2}{A_m^2-A^2}} \quad \ldots\ldots\ldots\ldots (6).$$

(1). This formula is usually given in the form $R=2\delta f L$, where R is that quantity which will give the total power developed when multiplied by the square of the effective R.M.S. current in the conductor. In the case of an aerial, owing to the variation of the current amplitude throughout its length, the effective value of this current is given by

$$A=\frac{I}{\sqrt{2}}$$

where A is the effective R.M.S. value of the current throughout the aerial and I is the R.M.S. current at the foot.

That is, $$P=RA^2=\tfrac{1}{2}RI^2$$

In order therefore to reduce the total resistance R to the same rating as that previously observed for R_r and R_e, we must take half the value given by the above formula and say that $R=\delta f L$. We can then find the total power developed from the formula

$$P=I^2R.$$

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The value of δ_1 may be found from the high-frequncy resistance of the wave-meter by the formula

$$\delta_1 = \frac{R_1}{2fL}, \quad (2)$$

where R_1 is the high-frequency resistance of wave-meter, and from this the value of δ may be found.

The resistance required, R, is then given by

$$R = \delta f L.$$

The shunted telephone method is sometimes used for comparing current strengths in the wave-meter, instead of a galvanometer.

Two tests should always be made for the value of $\delta + \delta_1$, one with the wave-meter out of tune on a wave slightly longer than λ_m, the other on a slightly shorter wave than λ_m. Each test should be verified by several repetitions and the mean of the two results taken.

Example.—Let us consider the same aerial as before. Its capacity will be about ·0011 mfds., so that the inductance at 600 m. wave length will be about 9×10^{-5} henries.

Let δ obtained as above have the very probable value in practice of ·4.

Then $R = \delta f L$
$= \cdot 4 \times \frac{10^6}{2} \times 9 \times 10^{-5}$ ohms
$= 18$ ohms
So that $R_e = R - R_r$
$= 13 \cdot 5$ ohms.

And the total power developed in the aerial with 10 amperes current is given by

$$P = I^2 R$$
$$= 1800 \text{ watts.}$$

Also since $P_r = 450$ watts the radiation efficiency is $\frac{450}{1800}$ or 25 per cent.

(4). The above figures are typical of any similar aerial of which the earth connections have not been made with great care in favourable soil. They show a loss of 75 per cent. of the power developed in the aerial, and a bad earth connection could easily give a higher value of δ than ·4 and entail still greater loss of power; 600 m. is about 1·5 times the natural wave length of the aerial, and consequently the wave on which it would radiate most efficiently. On longer waves the efficiency would fall off greatly; for instance, on 1,000 m. the radiation resistance would only be 1·6 ohms, while the

(2). See note (1) above.

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total resistance would be rather more than before ; that is, the radiation efficiency would be less than 9 per cent.

As has been already stated, by far the greater part of R_e is, under normal conditions, due to earth resistance, and the only means of materially reducing R_e is by improving the earth connections. With a well-made earth in good soil the value of R_e for the above aerial, on 600 m. wave, might be reduced to 4 or 5 ohms, giving a radiation efficiency of about 50 per cent. Since 1,800 watts is the power developed in the aerial, this improvement in earth connections would increase the power radiated from about 450 watts to about 900 watts. Also as the total aerial resistance is reduced from about 18 ohms to about 9 ohms, the current, $\sqrt{\frac{P}{R}}$, is increased from 10 amperes to 14 amperes.

It is clear that the effect of the earth resistance is not absolute, but depends on the comparative value of the radiation resistance, and the lower the radiation resistance the better the earth connections must be to avoid large losses. Thus a long, low aerial, which necessarily has a low radiation resistance $\left(\text{since } R_r \propto \frac{h^2}{\lambda^2}\right)$ will need very especial care taken over the earth connection if it is to radiate at all efficiently. Fifty per cent. efficiency cannot in any case be expected with an aerial of length greater than about twice its height, and the shape of a directive inverted L aerial imposes a very low value on its radiation efficiency, even with the best possible earth connection.

Example.—For instance, if instead of the aerial previously considered, 40 m. high and 80 m. long, we take one 27 m. high and 108 m. long, which will have about the same natural wave length.

Here $T=4$ approximately.

$$\therefore \quad h=27\ (\cdot 4+\cdot 6\times\tfrac{4}{5})\text{ m.}$$
$$=24\text{ m.}$$

$$\therefore\ R_r \text{ at } 600\text{ m. } \lambda=1580\times\frac{24^2}{600^2}\text{ ohms}$$
$$=2.5\text{ ohms,}$$

$$\text{and}\quad R_r \text{ at } 1000\text{ m. } \lambda=1580\times\frac{24^2}{1000^2}\text{ ohms}$$
$$=\cdot 9\text{ ohms.}$$

So that an aerial current of 10 amperes would only mean a radiated power of 250 watts and 90 watts respectively. The earth resistance in each case might easily be enough with an indifferent earth to raise the total resistance to about 20 ohms, so that the radiation

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efficiencies would be only about 12·5 per cent. and 4·5 per cent. respectively. With a good earth these efficiencies might be nearly doubled.

III. *Receiving* :—

The effect of the earth in receiving is much less simple to analyze than in sending, and at the same time the ill-effects of a bad earth connection are less felt. Put very broadly, the matter may be stated thus :—The strength of received signals is proportional to the power collected by the aerial from the passing waves, and this depends mainly on the height and capacity of the aerial, and, to a less degree, upon its properties of re-radiation, since it is a principle that a good radiator is a good absorber. These properties of re-radiation depend largely on the earth connection, as has been shown above in connection with the radiation efficiency, and to that extent a bad earth connection impairs the receiving properties of an aerial.

The fact that receiving is much less affected by bad earth connections than sending is borne out by some early experiments by Admiral Sir Henry Jackson. The following is an extract from his paper which refers to the subject :—

> " Repeated experiments with and without earths on the transmitter and receiver have shown that, in the open sea, signals may be obtained up to 50 or 60 per cent. of the full distance, without earths on the receiver, though such a good proportion is unusual, the average being 30 per cent. A condenser of suitable capacity acts nearly as well as a good earth ; without an earth on the transmitter the percentage of distance has never exceeded 15 per cent."

IV. *Counterpoise* :—

(1). An important side of the subject under discussion is the question of the insulated counterpoise as opposed to the direct earth connection.

(2). *Sending.*—In sending with the counterpoise certain losses are eliminated, namely :—

(*a*). Those due to resistance of contact between earth plates and soil.

(*b*). Those due to the interposition in the dielectric, between the elevated and the buried areas of the aerial system, of the upper layer of more or less conductive earth.

Earth resistance appears none the less in another form and with a like effect on the efficiency of radiation. The space between the counterpoise wires and earth carries a large dielectric current ; the lines of force penetrate the earth's surface to a greater or less depth according to its magnetic and conductive properties and set up earth

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currents which entail serious energy losses. There are also heavy losses due to direct induction in the soil from the oscillating currents in the counterpoise wires.

These combined losses will often be less than those of the conductive earth connection, unless the latter is a very good one. We may take for example certain stations which were fitted for purposes of comparison with both conductive and counterpoise earths, the former in unfavourable soil. While sending on full power the aerial current with the former was slightly less than with the latter; in other words, the total resistance R_r+R_e with the conductive earth was rather greater than with the counterpoise. R_r was the same in each case, since it was proportional to $\frac{h^2}{\lambda^2}$, so that R_e with the counterpoise was nearly as great as with the conductive earth. Since the counterpoise eliminates all losses due to headings (*a*) and (*b*) above, it follows that the earth losses due to induction are very great.

It appears in practice that a counterpoise aerial has less capacity and more inductance than the same aerial earthed conductively. For instance one of the aerials referred to above showed the following measurements :—

With earth—		
Natural wave length	570	m.
Inductance	72,300	cms.
Capacity	·00125	mfds.
With counterpoise—		
Natural wave length	570	m.
Inductance	103,000	cms.
Capacity	·000875	mfds.

and like results were noted with the other stations. On any one wave length the smaller capacity and greater inductance of the counterpoise would impart greater persistency to the oscillations, since $\delta=\frac{R}{fL}$.

We may summarize the comparison by saying that with a counterpoise R_e will often have a smaller value, the radiation efficiency will often be greater and the damping of the oscillations always less than with a direct earth connection. In spite of this its effect at a distance will be less than that of an aerial with a good earth, though a good counterpoise will send better than a bad earth. The reason for this superiority of the conductive connection may perhaps be found in the existence of some form of earth-conducted wave which is not present where the counterpoise is used.

On account of its small decrement, however, a counterpoise may often be used with advantage for quenched spark sets. In these

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sets the oscillations in the aerial decay with its own decrement and are not sustained by a persistently oscillating closed circuit; it is consequently of great importance to keep the decrement from all sources as low as possible.

(3). *Receiving.*—In receiving, the use of a counterpoise instead of a direct earth has a greater adverse effect on signals than in sending. This is accounted for by the smaller capacity of an aerial with a counterpoise, and may also be partly due to its missing some form of earth-conducted energy which is picked up by an aerial with a direct earth connection. A case in point is that of the aerial referred to above, which had both an earth connection and a counterpoise. The earth connection, owing to very unfavourable soil, was a bad one. It was found that the station sent more efficiently with the counterpoise, but received more efficiently with the bad earth connection. Similar results were obtained with other stations.

(4). It is sometimes said that an aerial is less affected by atmospherics when fitted with a counterpoise than with a direct earth connection. This may be so to the extent that an aerial with a counterpoise receives everything less strongly than with a conductive earth. The writer has tried with various stations which could be switched at will from earth to counterpoise, and has been unable to detect any difference.

V. *Methods of Construction* :—

(1). *Conductive Earth.*—The main objects to be attained in a conductive earth are three, namely :—

(*a*). Low resistance in the actual contact between earth plates and soil. This can be gained by the use of sufficient area of earth plate in moist soil.

(*b*). An easy path for the lines of electric force between the elevated area and the earthed area of the aerial. If these have to pass through any distance of semi-conducting soil the quality of the dielectric is impaired; earth currents are set up and energy losses are entailed in consequence. These losses can be minimized by making the earthed area commensurate in size with the elevated area, thereby saving the lines of force from distortion and reducing the distance they would otherwise have to travel through the soil to concentrate on an earth connection of too small an area.

(*c*). Avoidance of losses due to currents set up in the soil immediately below and around the aerial by direct induction from the aerial wires. The best means to effect this is to erect the aerial over damp low resistance soil. If the surface soil is of high resistance an artificial conductivity can be imparted to it by the free use of conductors buried near the surface in the form of extension wires joined to the earth plates, and these are of great assistance even when the soil is naturally of low resistance. This is to a great extent bound up with

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the former consideration, (*b*), because the extension wires, owing to their connection with the earth plates, will have the effect electrically of increasing the area of contact with moist soil.

With the above objects in view the ideal conductive earth for a permanent station should be constructed as follows :—

A ring of copper or galvanized iron plates should be sunk in a circle with the instrument room at the centre ; the plates should be on edge and bolted together, and should be just below permanent water level ; if the earth is really wet great width of plate is not required, and a complete ring a few inches wide constructed as above is better than the same quantity of copper in the form of large square plates at intervals round the circle.

The perimeter should when possible, with a non-directive aerial, be as great as that of the elevated part. With a roof of great area or great length this entails too large an expenditure of earth plate and labour to be practicable, and in this case the ring should be made as large as circumstances permit. An allowance of 10 sq. metres of earth plate per kilowatt of primary power is sometimes made ; this has at first sight no connection with the size of the aerial, but in practice it is a fair guide because power of a certain order is usually combined with aerials of a certain size.

Connection with the surface should be made at intervals of a few metres round the ring of earth plates, and from these points to the actual connection to the aerial coil in the instrument room the conductors should be carefully insulated. The best method is to carry the wires straight up from the earth plates to insulators some 8 ft. or 10 ft. above ground, and thence at a safe height to an " earth leading in insulator " in the wall or roof of the instrument room. The vertical part leading out of the ground may be of light rod or very thick wire to avoid danger of damage, and it may be guarded by the pole supporting the insulator.

The reason for insulating these radial wires and for making the earth in a circle is that, at the high frequencies employed, even a short length of straight conductor has a very strong inductive back E.M.F., and if any wires take a shorter path to earth than others they will offer so much less opposition to the high-frequency currents that these will concentrate in the shortest wires and cause serious heat losses. This will occur even if the earth connection at the end of the long wires is better than at the end of the short. For the same reason, if a wire makes a bad contact to earth before it reaches the proper earth plate, the current will take the shorter route to earth in spite of its higher resistance.

The above effect has nothing to do with the smaller ohmic resistance of the shorter wires, and should not be confused with it. As an illustration of the back E.M.F. of even a short length of straight wire when high-frequency currents are employed, a heavy spark to

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earth may be taken from the wire leading to a well-earthed plate, a few feet away from the plate itself.

(2). The ideal earth connection described above is seldom realizable in practice. If damp soil is not attainable all round the station, but only at one side, the earth connection may be made in an arc on that side instead of in a complete circle, and it is better to spend trouble in perfecting the connection where the soil is favourable than in attempting to complete the circle through the unprofitable dry soil. Extension wires could be run back under the aerial from the concave side of the arc. Even if the damp soil is at some distance from the station it would be worth extending the connection to reach it.

Where material or labour is not available for a complete circle of sufficient size, it is better to make the earth along arcs of this circle with intervals between, than to make a complete circle of much too small diameter. For instance, if plates are available to give only 120 ft. length of earth connection they could be arranged either in a complete circle of 40 ft. diameter or in two 60-ft. arcs or four 30-ft. arcs on opposite sides of a circle of 80 ft. diameter. For any but a very small station one of the latter arrangements would be preferable.

Where the soil is only slightly damp, wider plates are required to give greater area of contact, and the allowance of 10 sq. metres per kilowatt may not be enough for a satisfactory connection. Where there is no trace of moisture the above method cannot give a good conductive connection however great is the expenditure of earth plate. In this case the whole of such a system acts very much as a non-conductive counterpoise earth, and if it is of sufficiently large area it will give fair results of such. In perfectly dry earth however the ring of earth plates is of no use conductively and there is no object in insulating the radial wires above ground, so that the best arrangement resolves itself into a system of buried radial wires as numerous as means allow, with no plates at the ends. They are only buried for convenience and safety and may be quite close to the surface. They then amount practically to a superior form of counterpoise, as they can far exceed in number any wires that could be conveniently supported above ground on insulators. Their length should be regulated by the rules given for a counterpoise in paragraph (3) of this section.

Where there is water only at a depth of several metres and the labour of digging a continuous circular trench becomes prohibitive, owing to rocky soil or any other difficulty, plates should be sunk to water level at intervals round the circumference and connected to the centre by radial wires as before. Unless the surface is perfectly free from moisture the radial wires should be carried above ground on insulators. With such a system of isolated earth plates

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each should be of as great an area as possible and large square plates are needed instead of the narrow strips which are enough in the case of a continuous circle.

In dry shifting sand with water at such a depth that it cannot be reached without shoring up the sides of the trench, the labour required is so great that it is better to sink galvanized iron pipes to water level by means of a pile driver, at intervals round the circumference.

Where water is at a great depth and a well is available, the earth connection may consist of a single large plate lowered to water level. This method is said to have been used with success for some French stations in the Sahara. A single plate cannot be called a good wireless earth in itself, and its success is probably largely due to the fact that the sand or rock through which the well is sunk acts as a dielectric and increases the effective height of the aerial. If this is the case the natural wave length will be increased in accordance with the extra length of aerial, and the best theoretical position for the instruments, where there is greatest current intensity, would be at the bottom of the well.

Where a ring of earth plates is used, especially in soil of poor conductivity, losses due to induction of earth currents from the aerial may be reduced by the use of extension wires referred to above. These should take the form of wires near the surface radiating from the ring of earth plates to cover the whole area beneath the aerial. They should not be used, however, with a conductive earth which is sunk to a considerable depth to reach water, as they would then make an artificial conducting surface at a higher level than the earth plates and so reduce the effective height of the aerial. Any network of wires or system of coarse wire netting is suitable, so long as the principal conductors of the system run parallel to the aerial wires above.

Conductive earths are sometimes made in two separate halves, to enable the earth resistance between the two to be measured by some direct current method. This will, of course, give no measure of the value of R_e as defined in Section II., but it is an indication of the state of the connection as regards conductive contact with earth, and will show if the resistance is increasing owing to the soil drying up, to corrosion of underground joints or any other reason.

(3). *Counterpoise.*—With a counterpoise, the losses due to the resistance of direct earth contact, and to the interposition of partially conducting earth in the dielectric between the upper and lower areas of the aerial system, are eliminated. There remain the losses due to earth currents below the counterpoise, and these losses, as has been shown, may be great. They can be minimized by erecting the station over damp soil and giving the counterpoise sufficient area. It should cover all the ground immediately under the aerial and

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extend some way beyond in every direction. The natural wave length of the counterpoise should be the same as that of the aerial. This can be attained with sufficient accuracy by making the radial length of the counterpoise nearly as great as the combined vertical and radial lengths of the aerial. This would mean, in an umbrella aerial, that the counterpoise radius should be greater than the aerial radius by nearly the height of the mast.

Whatever the shape of the aerial, the most efficient shape for the counterpoise is circular, with as many radial wires as possible, as in this form it covers the greatest possible area of ground, and this provides a greater area of earth surface to take the currents set up, and so reduces the resistance. Where the soil is of high resistance it can be given an artificial conductivity by the use of a system of surface wires, on the same lines as the extension wires of a conductive earth, but making no conductive connection with anything else. These may be used with advantage even when the soil is good. If the station stands on perfectly dry and non-conductive sand or rock, however, the induced earth currents and the losses due to them will in any case be negligible and the addition of surface wires should be avoided.

The requirements of a good counterpoise are therefore simple and need no elaboration ; they are :—

(*a*). It should be erected over damp soil.

(*b*). It should have the same natural wave length as the aerial and should cover as great an area as possible consistent with this condition, with as many wires as possible.

(*c*). It should be symmetrical; that is, its component parts should be of equal length to ensure even distribution of current.

(*d*). It should be well insulated.

Points (*b*), (*c*) and (*d*) above are always attainable by good design. If damp soil is unobtainable it is more important to cover a large area and (except with perfectly non-conductive soil) to use surface wires.

In a directive station, the use of the ideal circular counterpoise is prevented by its great area, and the counterpoise is usually confined to the space under the aerial.

(4). In both conductive and counterpoise earths conductors of suitable gauge for the current should of course be used to avoid ohmic losses in the wire. These losses may be made so small as to be practically negligible, but their existence should not be lost sight of.

(5). *Earth Mats.*—The earth mat of copper netting which is simply laid on the ground is very common with small portable stations. Though possessing great advantages of portability and simplicity, it has little to recommend it electrically unless it can be laid in mud or on growing grass whose moist roots form innumerable earth

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contacts. To get the best out of it, at least four mats should be used laid out radially, and they should be as long as possible. A good counterpoise gives better results under nearly all circumstances; but it entails complications of reels of wire, insulators and supports to carry about; it takes several minutes to erect as opposed to the few seconds required to unroll earth mats; it impedes access to the station and it needs a large area of fairly level ground free from bushes which would make contact with the wires.

(6). *Directive Aerials.*—It is said that the directive effect of an inverted L aerial is increased by making the earth connection out towards the distant station. If a conductive earth is used it may take the form of an arc or semicircle of earth plates on this side of the aerial, or extension wires may be run out from a complete earth circle in the direction of the distant station. In the case of a counterpoise any possible advantage of extending it towards the distant station as well as under the aerial is outweighed by the drawback of requiring twice the area for the station.

VI. The foregoing summarizes most of the purely practical aspects of the question. It shows that special attention to the earth connections may double or treble the radiation efficiency of an aerial and thus have the same effect as increasing the primary power in that ratio, or reducing to a half or a third the power necessary for any given range with a bad earth connection. The construction of a really good earth is laborious and costly even in the most favourable soil, but it is all capital cost with negligible running expenses, and it saves both the extra initial and running expenses of the more powerful generating plant which would be required with an indifferent earth. Apart from the economic question of comparative cost, it is infinitely more satisfactory from the point of view of the engineer as a craftsman, if he can avoid the clumsiness of overcoming intermediate inefficiencies by lavish expenditure of primary power.

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METAL MELTING AND THE FUEL QUESTION.

At the Annual Meeting of the Institute of Metals, held at the end of March at Burlington House, Piccadilly, London, the members present were asked to give their consideration to four most interesting papers dealing with various aspects of metal melting, with special reference to the type of fuel used in the process.

Mr. George Bernard Brook, lecturer in Non-ferrous Metallurgy in the University of Sheffield, began his paper on "Coal-Gas as a Fuel for Melting Non-ferrous Alloys," by stating that gas had always seemed to him the ideal fuel for such purposes. He then proceeded to give particulars of a test undertaken by him, on a large scale and closely following commercial practice, in order to provide reliable data upon which manufacturers could work. From the results of this test the main advantages of coal-gas as a fuel may be summarized as follows:—

1. The absence of dirt and accumulated ashes.
2. The elimination of the difficult and wasteful process of "slagging."
3. Economy in fuel.
4. Convenience.
5. Considerably smaller loss of metal than with solid-fuel furnaces.
6. Reduction in actual fuel costs.
7. Higher speed of melting, ensuring greater output.
8. Superior mechanical qualities of the metal.
9. Reduction of oxidation to the minimum.

Mr. C. M. Walter, B.Sc., of Birmingham, discussed in detail "Metal Melting by Means of High-Pressure Gas," and laid special stress on the point of metal losses, which, he said, should receive full consideration in any comparison of the relative melting efficiencies of various types of furnace plant. He pointed out that very considerable economies had been obtained in the melting of brass with gas-heated furnaces, the regulation of the temperature of which is under complete control, whilst the atmosphere in contact with the surface of the metal is non-oxidising, and any metal spilt over the side of the pot is directly recoverable by the removal of the bottom plate from the furnace; and he gave it as his opinion that the economies effected owing to the reduction of metal losses alone where high-pressure gas furnaces are employed, as compared with solid fuel furnaces, more than outweighs the extra fuel cost involved.

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The third paper, by Mr. W. J. Hocking, dealt with "Metal Melting as Practised at the Royal Mint," and gave, among other interesting details, the results of a protracted series of experiments, made with various classes of fuels and burners, which proved that the most satisfactory results as to speed of melting and economy of cost were obtained by the use of coal-gas at low pressure. Mr. Hocking stated that comparative records kept over two periods of five consecutive years, during the latter of which (when gas was used) nearly 10,000 tons of metal were melted and cast into bars for coinage, show an economy in favour of gaseous fuel under each of the following heads: Output (the increase per furnace varying from 88·5 per cent. to 161·1 per cent. with different metals); fuel expenditure (a 3½ per cent. cash saving effected with gas); cost of graphite goods (a 32·6 per cent. reduction effected with gas); and cost of labour (a 20 per cent. reduction).

Mr. H. M. Thornton, M.I.MECH.E., and Mr. Harold Hartley, M.SC., jointly presented the concluding paper on "The Melting of Brass and Copper in a Crucible Furnace with Coal-Gas Fuel," and gave figures to prove that the thermal efficiency of the gas furnace is about five times that of the average solid fuel furnace. In regard to the life of pots, they stated that "In a gas-fired furnace the abrasive action of the solid fuel is eliminated, the direction of flow of the gas stream is under better control, the sulphur content of the fuel is very small, there is no fire to poke, and clinkers have not to be removed from the outside of the pot, so that it is not surprising that long lives can be obtained . . . We should expect a 50 per cent. increase in the pot life when a gas-fired furnace is substituted for one coke-fired." They also hold that "to claim a saving of time for melting of 25 per cent. with a gas-fired furnace, against ordinary practice with a solid fuel furnace, in the melting of brass would not be excessive."

These extracts go to show that the gas furnace is an efficient means for metal melting, and that it will go further there can be no doubt.

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REVIEWS.

ARCHITECTURAL BUILDING CONSTRUCTION (VOLUME I.).

By W. R. JAGGARD, F.R.I.B.A., *and* F. E. DRURY, F.I.S.E.—(Cambridge University Press. 1916. 6s.).

THIS text-book for architectural and building students is the first volume so far published of a set of three. It is planned on novel lines. The authors explain their aims at some length in two prefaces, one to the series as a whole, the other particular to this volume, and these may be summarized as follows :—

Building construction should not be divorced from architectural design, and good architecture must be based on intimate and complete knowledge of the materials and component units of buildings. Study of the work of predecessors, including the best modern buildings, is essential. The authors deprecate riding this idea of critical study too hard in the earlier stages of instruction, and recognize that at the commencement " the teacher should be to some extent dictatorial and whilst selecting a well-proportioned and designed study as an example should insist on the construction being shown in a definite manner, although he knows that infinite variety, both in design and construction, is possible." Building construction has hitherto been presented in the form of isolated examples. The authors now take two building designs, specially made for the purpose, which embody nearly all the items necessary for an elementary knowledge of building construction and teach, so to speak, from the structure itself.

The buildings chosen are a brick cottage and a workshop building of brick with a stone frontage. Volume I. deals with all their leading structural details. (Volume II., we understand, will deal with materials, plastering, painting, etc.). There are full detailed drawings in a pocket at the end of this volume and the text is illustrated by many perspective and other drawings of details. The general method followed throughout is to take a subhead such as masonry and explain all the ordinary forms in which it is found in buildings generally, some of the illustrations being photographic. The particular application of previously described types of walling to the masonry in these two buildings is then considered, very clear dimensioned and dissected perspective sketches of details being given. The two buildings are really thoroughly well described in an instructive and interesting manner, and a book of this kind is certainly much brighter reading than a standard text-book such as Rivington, though of course it does not cover such a wide field. In the third volume the authors say that " they intend as far as possible to select

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examples of established taste and architectural value to illustrate advanced principles of design, maintaining in some cases the constructional details given them by their designer or constructor, but in others adapting the construction in accordance with modern methods and the more extended use of machinery."

Judging by the first volume the whole series promises well, though this system of teaching has its limitations. Within those limits however the keynote of the present volume is thoroughness. It is no mere bookish compilation of details, but a careful study of their practical application, and it should be especially useful for self-instruction. The authors themselves do not claim that the book is sufficient in itself without parallel study of models or buildings and the preparation of measured drawings by the student.

V.P.S.

PAGES D'HISTOIRE, 1914—1915.

(Librairie Militaire Berger-Levrault, Paris, 5—7, Rue des Beaux-Arts).

Continued from the R.E. Journal, April, 1917.

The 106th number of this series is entitled *Le Développement Économique de L'Allemagne Contemporaine;* in it Monsieur Albert Pingaud —Consul General of France—traces the commercial and industrial growth of the German Empire from the time of its foundation in 1871 to the outbreak of the present War in the autumn of 1914. In the opening pages of this volume Monsieur Pingaud tells us that a few months before the outbreak of the present War the late Field Marshal Von der Goltz, having been invited to say a few words of encouragement to the members of a Military League, addressed them and in his speech stated that it lay with them whether the German Empire, founded at the price of such great sacrifices, would continue in the future as something which was permanent or whether this Empire only represented an ephemeral episode in the annals of the world.

Monsieur Pingaud remarks that, at the time of writing, the Armies of the Entente Powers were engaged in a task the completion of which would lead to the realization of the second term of the alternatives above quoted.

The conditions of economic life in Germany are discussed in this volume under two heads: (*a*), The country; and (*b*), its men. It is pointed out that the material prosperity of a country depends on its physical conditions and the characteristics of its people, its natural riches and the labour of its people. So far as the first of these considerations is concerned Germany, in comparison with her neighbours, was at a considerable disadvantage as long as she remained a purely agricultural country. The soil of Germany neither possesses the fertility of that of Italy, nor the suitability for variety in cultivation possessed by that of France, nor the possibility of raising wheat on the scale adopted in Russia, nor even the diverse characteristics possessed by that of the

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Dual Monarchy. Germany for a long time seemed, by reason of the poverty of its soil and the unfavourable character of its climate, the most poverty-stricken of the principal nations of Europe ; as luck would have it, however, Germany possessed three natural advantages to counterbalance the two disadvantages referred to, advantages which she was able to turn to good account once the era of industrialism made its appearance in the Empire. These advantages are her mineral wealth, her river system and her geographical position.

The above advantages would naturally have counted but for little had it not been that Germany possessed a people of sufficient energy and application to utilize the favours nature had conferred on the Fatherland.

In seeking for the psychological reasons for the success of the German race one is sometimes tempted, says Monsieur Pingaud, to attribute it to good works organization, the excellence of the technical education in Germany, to the close co-operation which has been inaugurated between theoretical science and industrialism on its practical side. He who does not search beyond this explanation of German success runs the risk of confusing the effect with the means employed to produce the same, the principal with the accessory, the sentiments which are the mainspring of German effort with the procedure adopted or the machinery employed. Germany has raised herself to the high level in economical development attained by her alone by reason of the utilization of certain inherent qualities of the Teutonic race, the value of which had already been proved out in other domains of life. There are two qualities possessed by the Teuton in a pre-eminent degree from which spring the others which make for success.

The first of these is that to which the Germans have applied the term *Gründlichkeit*, a term for which there is no exact equivalent in the English language ; it means that quality of thoroughness and of tenacity of purpose which enables a man to overcome, by hook or by crook, every obstacle to the accomplishment of an enterprise in hand or of an idea. Monsieur Pingaud points out that, whilst this quality procures those great results which are inspired by powerful efforts, yet at the same time, it does not promote that sense of proportion and moderation in the German, which are alone a real measure of worth and of permanence. Indeed this quality tends to produce a peculiar mental attitude in the faculties of those possessing this quality, an attitude which causes them to concentrate their whole energy on to some single object and their work is, in consequence, cramped, artificial and unstable.

The effects of this faculty of exaggeration is noticeable in every field of enterprise upon which Germany has embarked in the 19th century. During the period of her intellectual greatness (1780—1830), when she was seeking to win over the spiritual side of the world to her school of thought instead of attempting, as more recently, to dominate the material side of the world by the use of the sword, she surpassed all other nations in the fields of speculation and of scientific enquiry. However, by degrees, her philosophers strayed into a nebulous atmosphere and lost themselves as in a maze ; in the fields of science they made discoveries in relation to the most intricate matters and propounded the boldest of hypotheses ; in the fields of philosophy, they originated one of the vastest

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of systems and the most arbitrary of theories ; in the fields of learning, they exhibited an example of supreme patience and of attention to useless minutiæ.

At the heroic epoch in her military annals, Germany produced Clauswitz, the most rigorous theoretician who has expounded the maxims of war, and later Moltke, the most faultless Chief of Staff, and one who applied the principles contained in the foregoing maxims with the most complete success. But in her blind worship of *force* and in her claim to apply it, as by an iron rule, in relation to international affairs, Germany has raised against herself universal enmity, and she has lost in the political domain all the advantages gained by reason of her military successes.

The second prominent quality in the Teutonic character is the poor regard paid to individual personality which, on the contrary, is held in so high esteem with the Anglo-Saxons. The instinctive tendency that the German possesses to have someone always to lean upon causes him, says Monsieur Pingaud, to be submissive in his relations with his superiors, to seek association with his equals, to be imitative when engaged on work of a constructive nature, and to be assimilative when he transfers himself from his natural environment into a strange or foreign one. It is, however, this second quality which has brought about the high state of organization which exists in Germany in practically every field of enterprise.

It is the absence of individual personality which has made it so easy for Germans to emigrate to lands under a flag other than their own and to accept the *régime* they have found there with complacence ; nevertheless, they do not forget the Fatherland ; on the contrary, they are the best pioneers of its influence and the most faithful clients of the products of their homeland. The three and a-half million Germans who have settled beyond the frontiers of the Fatherland have contributed in a high degree to its commercial expansion.

To sum up then, when in about 1871, the era of material development was inaugurated in Germany her sons displayed two qualities rarely associated together, a combination which is largely responsible for their success : tenacity of purpose in pursuing their ends, and flexibility of character in the choice of means employed.

Monsieur Pingaud next briefly examines the four phases in the development of Germany in modern times. The first period covered the years 1871 to 1879 and was one of experimentation. Little progress was made during this period ; the German efforts to expand commercially were premature and hence proved fruitless. The second period extended from 1880 to 1894 ; these were years in which to a large extent stock was being taken of the situation. Considerable progress was made ; Bismarck's far-seeing policy being largely responsible for the measure of success obtained. His fiscal policy protected home manufacturers, and during the period 1885 to 1890 German exports increased by 50 per cent. The figures relating to German commerce show that during 1884 and 1885, for the first time since 1870, Germany had slightly overtaken France in the commercial field, and in 1887 this advantage was permanently gained, so that in the year last mentioned was partially realized the dream of a " Commercial Sedan," a dream the fulfilment of which

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had been longed for, since the conclusion of the Franco-German War, by the early pioneers of Pan-Germanism. The third period extended from 1895 to 1907; this was a period of great expansion internally, and during these years the accumulated effort of Germany began to tell decisively in her favour. During this period foreign markets were invaded by German manufacturers, who later established for their country a powerful position in the industrial and commercial world.

The financial crisis of 1907 ushered in the fourth period, which extended from 1908 to the outbreak of the War in 1914. During this period, intoxicated by her previous success, Germany fell a victim to paroxysms of excess leading to over-production; her strength was overtaxed and the fact was exposed that her ambitions soared higher than could be justified by her capacity to play the part she hoped to in this world. The great European War is putting the supreme test on the structure built up by German manufacturers and business men and will result in proving out whether it rests on a solid foundation.

In dealing with the economic development of Germany, Monsieur Pingaud sums up the changes which took place in that country during the period 1870 to 1914 in the following words:—"At the time of her unification she was still very largely an agricultural country; but after four-and-forty years of Empire, she belonged to the industrial type of States, and from this have followed a series of consequential effects of a geographical and social nature, which together have profoundly modified her primitive characteristics." Whereas in 1882 about 43 per cent. of the population of Germany belonged to the agricultural classes, in 1907 only about 29 per cent. did so. During the same period the proportion of the classes engaged in the industrial and commercial spheres increased from 45 per cent. to 56·3 per cent. Germany has during the process of industrialization also been faced with the problem which has troubled social economists in our own islands, namely, the flow of population from rural to urban areas (*der Zug nach die Städte*).

In dealing with the question of the wealth of a nation, it is pointed out that three elements must be taken into consideration; (*a*) the accumulated capital in the country, (*b*) the total annual incomes, and (*c*) the net incomes, after outgoings have been deducted, representing the savings of the nation. Many estimates have been made of the total of the private fortunes in Germany; the estimates of eminent Germans, who have studied the subject, vary from 17,000 millions sterling to 11,500 millions sterling. It would appear that the last-mentioned figure most nearly represents the truth. A similar difficulty has been experienced in obtaining accurate figures relating to incomes; it has been put by one authority at 2,150 millions sterling per annum. So far as any conclusions can be drawn from the figures available, it would seem that since 1870 the accumulation of wealth, as represented by private fortunes, has proceeded at double the rate of the increase in the population of the Empire during the same period.

The remarkable results which have been so rapidly obtained in Germany have brought in their train inconveniences. The more German trade has expanded beyond the frontiers of the Empire the more vulnerable she has become.

The dangers of the situation seem to have escaped observation in Germany

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or, may be, it was thought that any European war would be exceedingly short and, in any case, foolish Britain would remain neutral and keep open the sea routes for the trade of her most formidable rival in Europe.

In conclusion, Monsieur Pingaud states that there can be no doubt that the industrial development of Germany is not directly responsible for the War, but it has contributed powerfully to the creation of a state of mind in the Empire which rendered it probable, desirable, inevitable. "Far from restraining *military Germany* from following the path which could lead only to a European conflagration, *industrial Germany* has also turned down the same path, hoping thus to find its interests definitely satisfied. The latter possesses then a share in the responsibility for the catastrophe which threatens to annihilate, simultaneously with the destruction of the greatness and political unity of the Empire, the economic results obtained at the price of half a century of uninterrupted labour and of two decades of astounding success."

The 107th number is entitled *Explosions et Explosifs;* it is contributed by Monsieur Henry de Varigny, and forms a very useful handbook on the subject of explosives. In a brief preface the author states that at no time previously has there been such a consumption of explosives as during the present War. The subject, he tells us, is one of immense importance, but, in a work prepared for the public at large, it is naturally not possible to enter into technical and mathematical details. Those who wish for further information are referred to the work of Berthelot, of Sarrau, of Vieille and other authors. The following recently published works on the subject are also mentioned :—

Les Poudres et Explosifs, by L. Vennin and G. Chesneau (1914).

Les Explosifs Modernes, by P. Chalon (1911).

Explosives ; their Manufacture, Properties, Test and History, by A. Marshall (1915).

Les Explosifs et leur Fabrication, translated by J. A. Montpellier from the Italian work by R. Molina.

Dictionnaire des Explosifs, translated by M. Désortiaux from the English work by Cundill.

Le Chauffage Industriel, by H. Le Chatelier.

Dictionnaire des Matières Explosives, by Daniel.

La Chimie du feu et des Explosifs, by A. Job.

The contents of the volume under review deal with the following matters :—Definition of explosion ; definition of explosive ; difference in characteristics of various explosives ; speed of propagation of explosion ; methods of measuring velocity of propagation of explosion ; prediction of the explosive force of a substance ; experimental measurements of pressure and energy of explosives ; practical tests with explosives ; priming of explosives ; chapter of accidents ; classification of explosives ; gunpowder ; chlorates, cheddites ; fulminates ; nitrated cellulose, smokeless powder ; nitro-glycerine and dynamite ; picrates and mélinite, trinitrotoluol. Sprengel's and Favier's explosive compounds, Schneiderite ; liquid oxygen explosives ; the ideal explosive.

Monsieur De Varigny in conclusion states that although he has largely referred to the work of Frenchmen in relation to the science of explosives, it would be unjust to overlook the very great part played by British and Italian chemists in this branch of science.

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The 108th number is entitled *Les Forces Économiques des Puissances Belligérantes avant la Guerre ;* it contains on a single sheet, prepared by Monsieur B. Fayolle, statistical information concerning the two belligerent groups and letterpress calling attention to the principal items contained on this sheet.

The following is a summary of the more important information on the sheet :—

France and her allies possess more than :—

$\frac{1}{2}$ of the globe, of its inhabitants, of its corn, of its mercantile fleet and of its export trade.

$\frac{1}{3}$ of its coal, of its iron and of its railways.

Germany and her allies possess :—

$\frac{1}{4}$ of the world's supply of coal.

$\frac{1}{5}$ of its iron and of its commerce.

$\frac{1}{10}$ of its inhabitants, of its corn, of its railways and mercantile fleet.

$\frac{1}{25}$ of the globe.

Monsieur Fayolle under the heading " Conclusions " states :

" The three matters in which the superiority of Germany allowed her to declare war against us and to prosecute the same ; the three arms of Prussian militarism are :—

An Abundant Population.
Discipline and Organization.
Extensive Coalfields."

" The three conditions for ensuring to France a durable and fruitful peace are :—

Repopulation.
Reorganization.
Independence in Respect of Fuel."

A brief reference is also made in this volume to the Economic Conference of the Entente Powers held at Paris in June, 1916, and at which Monsieur Clementel, Minister of Commerce and Industry, presided.

This Conference had for its object the adoption of measures which were intended to result in co-ordinating the *unity of economic action* in order to promote to the highest degree *unity of military action.*

The resolutions passed at this Conference are published in the volume under review, as also the names of the delegates sent by the Powers interested.

The 109th number is entitled *Les Chansons de la Guerre.* In a preface, in verse, Hugues Delorme writes of the songs contained in this volume in the following terms :—

Hymnes d'amour et de foi, cris de haine
Clamés bien haut ou fredonnés tout bas,
A vos accents chaque soldat s'entraine
Pour le succès d'héroïques combats,
Et quand du sol de notre douce France
Naîtra la Paix, les verts lauriers au front,
Fêtant l'orgeuil de cette délivrance,
Des chants encor, par milliers la suivront.

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The volume contains 53 songs dealing with topical subjects connected with the War. In these verses William II. and the Bosches come in for their share of attention ; they are referred to in far from complimentary terms. The verses are, however, for the greater part devoted to matters which are of closer domestic interest to the rank and file of the French Army.

The 110th number is entitled *Les Emprunts de Guerre de l'Allemagne.* In six brief chapters Monsieur André Liesse deals with the methods employed by Germany for financing the War ; an appendix is attached containing information concerning Austrian and Hungarian War Loans.

In an introductory chapter, Monsieur Liesse states that when Germany applied the torch which set the present conflagration ablaze, neither her own financiers nor those of any other country can have realized that the expenditure which would be required to cope with the situation would run into thousands of million francs. The appreciation of the situation by the German Great General Staff, as well as by the German economists and financiers, have both proved incorrect ; they expected a war of short duration, facts show the falseness of their deductions. At the time hostilities commenced, Germany had adopted certain measures to cope with the financial situation. As is well known she had stored away in gold, in the famous Julius Tower of Spandau, a sum exceeding slightly eight millions sterling and arrangements were in hand to permit the Reichsbank to issue Imperial banknotes equal in face value to three times the authorized note circulation of this institution.

The German people have long been accustomed to paper money and therefore the increase in circulation of notes did not perturb them. The Loan Offices which were opened at the commencement of the War were also no novelty to them ; such institutions had already on former occasions been brought into use at times of crises and war, *e.g.*, in 1848, 1866 and 1870—1871.

Problems connected with the mobilization of the national financial resources had not alone been the dominant preoccupation of the German Government but also that of German financiers. Dr. J. Riesser, a Professor at the University of Berlin, who 20 years ago was a Director of the Darmstadt Bank, had long devoted himself to the study of the subject of the mobilization of financial resources, a subject of the utmost importance to Germany. He presided at a conference of German bankers in 1912 and gave very sound advice on the subject. A work by Dr. Riesser was published just before the outbreak of hostilities ; in it he urged the necessity for financial preparations being made to meet the contingency of a war, so that a smooth and prompt mobilization of wealth might be effected in order that the Imperial Government might have immediate and abundant funds at its disposal. He took no pains to hide the weaknesses in the organization of national credit and of the banks of Germany. The financial policy recommended for some years prior to the War by all far-sighted men in Germany can be summed up in the following formula :—

Adopt every measure possible which can in any way enable the whole of the assets of all institutions of credit, whatever may be the class to which they belong, to be rapidly rendered liquid in an emergency.

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In Chapter II., Monsieur Liesse deals with German and Prussian credit in pre-war days, and the resources to which the Imperial Exchequer and the Prussian Government could resort for funds. He points out that although the wealth of Germany has grown considerably in the past thirty years, yet her credit, as a State, could not be reckoned first class. She had first to abandon the idea of borrowing in respect of public funds at a nominal 3 per cent. per annum; next Imperial Germany and also Prussia had both to realize that they could not obtain subscriptions to their funds even at $3\frac{1}{2}$ per cent. per annum, so that since 1908 they have both been obliged to obtain money for public purposes at a nominal 4 per cent. per annum. The first 4 per cent. loans raised by the German Empire and by Prussia were issued in 1908 at 99·50 per cent. In 1909 and 1911 more confidence in the credit of the German Empire and also of Prussia was shown by the subscribing public, so that in the two years mentioned the Imperial and also the Prussian Government, in floating 4 per cent. loans, were able to fix the price of issue above par, namely, at 102·7 per cent. and 101·40 per cent. respectively. But a slump followed and in 1912 and 1913 both the governments mentioned had to be content to accept subscriptions at 98·60 per cent. and 97·90 per cent. respectively for their 4 per cent. loans.

Lately, considerable difficulty has been experienced by the German Government in borrowing money. German financial policy aimed at placing loans wholly within the Empire, so that the national credit should run no danger of being shaken owing to the action of possible adversaries in a European conflict. German industries and commerce were so prosperous that investments of capital therein afforded a very good return; this factor naturally tended to limit the amounts available for investment in government funds.

The advisability of putting an end to the series of annual loans and the perpetual issue of Treasury Bills on a considerable scale had been realized by the responsible authorities in Germany. Although it was recognized that the credit of the Empire would have been enhanced by the reduction of the National Debt, yet it was felt that insuperable difficulties would be experienced in imposing the necessary taxation in the several Confederated States of the Empire in order to deal with the situation effectually; in consequence, the idea of dealing with the reduction of this Debt had to be abandoned.

Taxation, Monsieur Liesse points out, although an advantageous method for procuring funds for public purposes in normal times, can never yield the enormous sums required for the conduct of a war, and particularly when it is one of long duration. Nevertheless, before the actual outbreak of hostilities, it had been decided by the German Government to impose a special war tax payable in three annual instalments, commencing in 1914; each instalment it was expected would amount to about 18 million sterling. The fact that this extraordinary *direct* tax had been introduced, has naturally imposed restrictions in relation to the other fiscal measures which the German Government are now in a position to take for the purpose of financing the present War. During the past few months Dr. Helfferich has proposed, in connection with the Budget for 1916—1917, to have recourse to new *indirect* taxes in rela-

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tion to certain articles of food and to transportation; it can only be extreme necessity that has compelled him to look to these supplementary sources of revenue.

The view was expressed in 1911, in the Prussian Upper House, by Herr Von Gwinner, one of the Directors of the Deutsche Bank, that it was a mistaken policy to attempt to meet the whole of the expenditure on a war by a consolidated loan. It is now generally admitted in Germany that, for the sake of the credit of the Empire, one-third of the war expenditure should be met by means of ordinary taxation and that only the remaining two-thirds should be provided for by loans. Since the War expenditure of Germany was up to the end of June, 1916, no less a sum than 2,000 millions sterling, if effect is given to the suggestion that one-third of this expenditure should be met by ordinary taxation, the German people will have to meet additional claims, in respect of ordinary taxation for the first two years of the War, amounting to over 666 millions sterling.

The provision for interest on the consolidated Debt of the German Empire amounted, in the Budget for 1914—1915, to nearly 12½ millions sterling. The nominal value of the securities representing this Debt was at that time approximately 248 millions sterling; adding the value of the floating debt, 16 millions sterling, we get 264 millions sterling as the total National Debt of the Empire. Each of the Confederated States has further a debt of its own; the nominal value of the Consolidated Debts of these States amounted at the period in question to 760 millions sterling and their floating debts amounted to about another 34½ millions sterling, bringing up the total National Debts of the several Confederated States to 794½ millions sterling. Therefore the total National Debts of the Empire and the Confederated States amounted at the time of the War to no less a sum than 1,058½ millions sterling. In the year 1902, these debts did not exceed 680 millions sterling, so that in 12 years the national indebtedness has, in Germany, increased by over 35 per cent.

In Chapter III. an examination is made of the sources to which the German authorities look for subscriptions to the Public Loans.

It would appear that although the Great General Staff at Berlin expected that their bold strategy would enable a decision to be reached in favour of the German arms within three to four months of the commencement of hostilities, there were many financiers who were by no means as confident that the German plans would prove so successful.

Monsieur Liesse in discussing Germany's problem in regard to the financing of the War says that in order to arrive at the financial power of Germany, from an impartial standpoint, it is necessary to dismiss from one's mind the astute procedure, the clever expedients in accountancy and the strong pressure resorted to by the Government in raising loans hitherto; to appreciate the situation correctly, it is necessary, he says, to concentrate attention on four factors of importance, three of them affecting economics and one of them psychology. These factors are:

1. The wealth accumulated in Germany during the past 20 years.

2. The liberation, in the case of certain industries, of their floating capital; these industries having been obliged to suspend operations on he declaration of war.

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3. The enormous profits of those industries which are engaged on war work.

4. The real discipline of the whole German nation, which has responded liberally to the pressing calls for financial assistance from the Imperial Government.

Each of these factors is examined in some detail by Monsieur Liesse. He points out that Dr. Helfferich, the present German Minister of Finance, in a brochure pubished in 1914, estimated the capital wealth of Germany at 15,000 millions sterling, but he himself thinks this figure too high, since it has to be borne in mind that Germany has experienced considerable losses in foreign lands through the War. Her mercantile fleet is idle, her export trade has suffered very considerable diminution, stocks and shares have fallen very considerably in value, in neutral countries as well as in Germany. Monsieur Liesse points out that if the wealth of Germany be taken, for argument's sake, at 8,000 millions sterling, it would nevertheless be impossible to mobilize even a small fraction of this sum for war purposes. For instance, the Savings Bank Deposits in Germany amounted in 1914 to 880 millions sterling, but of this sum over 72 per cent. is mortgaged and immobilized.

Further, the floating capital liberated in the industries which have had to suspend operations is no longer available, as it has already been diverted to the extension of munition factories and other enterprises connected with the War.

On the other hand, it is admitted in Germany on every hand that the profits of enterprises providing war material have been enormous, and there is little doubt that a great part of these profits can be looked upon as a sure source from which funds for financing the War can be obtained.

The fourth factor can be dismissed in a few words. In every rank of life in Germany, irrespective of the political groups to which its members may belong, discipline of a highly organized and automatic order exists; it is based on the belief that the Germans are the Chosen People; only untoward events of a very serious nature will shake their self-confidence. As long as this confidence lasts, the Imperial Government need anticipate no serious difficulty in connection with the raising of war funds.

In Chapter IV., Monsieur Liesse deals with the various kinds of securities issued by the Treasury in Germany; in normal times these consisted of *Schatzanweisungen* (Exchequer Bonds), *Schuldverschreibungen* (short term Loan Bonds) and *Reichskassenscheine* (Bills issuing from the Imperial Treasury under Laws of April, 1874, and July, 1913; Bills up to a value of 12 millions sterling have been issued under the authority of these two Laws). Treasury Bills, which carry no interest, were also issued in October, 1914, and September, 1915; from a memorandum drawn up in 1915 it appears that up to the 30th September, 1915, the total face value of these Bills was 9,514 million marks. The certificates representing these Bills are accepted by the German Government in respect of subscriptions to the War Loans.

By a Law of 4th August, 1914, an entirely new form of Imperial Treasury Bill, issued under the auspices of the Imperial Debt Office, was author-

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ized, the certificates being known under the term *Wechsel*, the object of the same being stated to be " to cover the extraordinary non-recurring expenses provided for in the Budget and to reinforce the ordinary floating capital of the Reichsbank." These Bills cannot remain in circulation for a longer period than three months from the date of their issue ; they are discounted by the Reichsbank, or other large banks, and are treated in their accounts in the same way as other commercial documents of value. As money raised by loans becomes available the Treasury redeems these *Wechsel* certificates ; thus the Government is able to procure funds to meet daily needs without appearing to make an open appeal to the public for funds. Another of the war measures adopted by a Law of the 4th August, 1914, was the creation of Darlehnkassen (Loan Offices) to which reference has been made earlier ; the details for the organization of these Loan Offices had been carefully worked out before the outbreak of war. The principal object of these Loan Offices is to make *advances* on documents of title or on goods ; the interest chargeable on these advances must not exceed the rate of discount paid by the Reichsbank ; the certificates of these Offices have face values of 5, 10 and 50 marks. By a Law of the 31st August, 1914, the Imperial Debt Office was authorized to issue certificates of a similar nature, having face values of 1 and 2 marks. The Reichsbank is in control of the Loan Offices and has been authorized to make advances up 120 millions sterling.

These advances are naturally made on a regular system, with a view to the protection of the lender, the maximum advance in any particular case is always below the full market value of the security against which it is made ; for example, the proportions of advance in relation to the full value are in the following cases as stated below :—

Certain classes of documents of title	40 per cent.
Merchandise	50 ,,
Certificates of certain public and communal funds, and of shares and debentures of German railways	70 ,,
Scrip issued by the Imperial Government and Confederated States	75 ,,

The German banks are co-operating closely with the Government at the present time and have been, so to speak, militarized in order the more effectually to mobilize the nation's resources and to handle the War Loans. Dr. Helfferich is said to have shown great cleverness in the way he has organized the War Loans.

In Chapter V. Monsieur Liesse gives details of the four War Loans raised by Germany up to April, 1916. The first of these Loans was launched between 10th and 19th September, 1914, after the German defeat on the Marne. The German Government and the Great General Staff had naturally taken measures to hide from the public the true nature of the reverse met by German arms on the occasion referred to.

Subscriptions were invited from the public to :—

(i.). *Schatzanweisungen* (Exchequer Bonds) up to the limited amount of 50 millions sterling. The certificates representing this part of the loan

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carry interest at 5 per cent per annum, the price of issue being 97½ pe cent.; repayment at par between 1918 and 1920 is provided for; and

(ii.). *Schuldverschreibungen* (Loan Bonds) up to an unlimited amount. The certificates representing this part of the loan also carry interest at 5 per cent. per annum, the price of issue being also 97 per cent., but repayment is not to commence in the case of this part of the loan till 1st October, 1924.

Under the foregoing conditions the actual interest earned on the sums invested is in the first case 5·57 per cent. per annum and varies in the latter from 5·33 per cent. to 5·13 per cent. per annum according to dates of repayment of the capital.

No limit was fixed in respect of the second of the above denominations; the total sum obtained by the Government on the above invitation was in round figures 224½ millions sterling.

The second War Loan was launched in March, 1915, *i.e.*, six months after the first loan. The German Government had been persuaded by this date that the duration of the War would be longer than was at first anticipated. On this occasion also the two same classes of security were offered as in the case of the first Loan and at the same rate of interest, viz., 5 per cent. per annum; but the price of issue was raised by 1 per cent. to 98½ per cent. The response of the public brought in in round numbers 453 millions sterling.

In September, 1915, the third appeal was made to the public. On this occasion subscriptions were invited only to the *Schuldverschreibungen*. The rate of interest remained at 5 per cent. per annum, but the price of issue was raised to 99 per cent. The holdings in this loan are neither repayable nor convertible till the 1st October, 1924; the issue was unlimited. This loan brought in 605 millions sterling.

Invitations for subscriptions to the fourth loan were issued in April, 1916, that is to say, the German Government has made its appeals for funds to the public at regular intervals of six months. On this occasion subscriptions both to the *Schatzanweisungen* and to the *Schuldverschreibungen* were again invited; the former carry interest at a nominal rate of 4½ per cent. per annum, the price of issue being 95 per cent., whilst the latter carry interest at 5 per cent. per annum, the price of issue being 98·50 per cent. Repayment of the former is to take place between 1923 and 1932; the latter are not repayable till 1924. The Government received 530 millions sterling from the public on this occasion.

In a chapter headed *Conclusion* Monsieur Liesse deals with "The fatal consequences of false conceptions." He points out that it is difficult from the bare facts recited above to arrive at the value which should be placed on the "*résistance financière*" of Germany. Although Dr. Helfferich has managed to squeeze some 1,800 millions sterling from his countrymen, as subscriptions to the first four War Loans, it cannot be denied that he may still be able to obtain further advances from them on somewhat similar terms. Nevertheless, it is evident from the statements made by Dr. Helfferich in the Reichstag that the German Government has been disappointed in the measure of support it has received in the financial schemes promoted for the prosecution of the War. It is

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further clear that the German Government is far from being in a position to effect the consolidation of the War Debt, in spite of the official announcements made that such a consolidation would take place shortly. The financial situation is more serious in Germany to-day than in any other country. The political and economical organization which Prussia has been allowed to impose on the rest of the German Empire possesses a congenital vice, in that everything is ordered and regulated by the State, even the grouping of industrial and commercial enterprises which are very often under the absolute control of the Government. This organization it is that has permitted Germany, thanks particularly to the richness of its soil in materials absolutely indispensable to modern industry, to continue to wage war against the Entente Allies for so many long months.

This mechanism, in spite of the excellence of the governing devices fitted to it, possesses the defect that it is dependent on a single control; it can only work automatically. The Government and the political and military publicists of Germany, says Monsieur Liesse, seem to have overlooked the fact that this mechanism does not, in every respect, possess the properties of machines constructed of iron and steel. When once the German masses are disillusioned in regard to the situation as pictured to them, it is likely that this ingenious mechanism will rapidly get out of order, in spite of the power of subjection exercised over the wills of German citizens, owing to the character of German discipline.

In an appendix to this volume a few notes are added regarding the War Loans raised in Austria and Hungary.

Prior to November, 1915, three loans had been raised in each of these countries; in each case at about the same time, *i.e.*, 1st Loan November and December, 1914 (repayable after 1920), 2nd Loan May and June, 1915 (repayable after 1st May, 1925), 3rd Loan October and November, 1915 (repayable after 1st October, 1930). In the case of Austria, the rate of interest is the same for each of these loans, viz., 5½ per cent. per annum, free of taxes. The price of issue has varied from 97½ per cent. in the case of the first loan, to 93·10 per cent. in the case of the third. The *estimated* total amount obtained by the Austrian Government in respect of subscriptions to these loans is stated to be approximately 336 millions sterling. The first and third Hungarian Loans (repayable after 1st April, 1920, and 31st December, 1921, respectively) carry interest at 6 per cent. per annum, free of taxes, the price of issue being respectively 97½ per cent. and 97·10 per cent.; part of the second loan (repayable after 1921) bears interest at 6 per cent. per annum and part of it at 5½ per cent. per annum, the price of issue of the first part being 98 per cent. and of the second 91·20 per cent., for cash payment. The *estimated* total amount of the subscriptions obtained by the Hungarian Government in respect of these loans is stated to be 178¼ millions sterling. The Austro-Hungarian Bank has played an important *rôle* in connection with the flotation of these loans; Loan Banks and Savings Banks have also been utilized for this purpose.

The 111th, 113th and 115th numbers contain the official communiqués, etc., issued by the Central Government to the provincial authorities in France; they are the XX., XXI., and XXII. Volumes (inclusive) which

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deal with this subject—the 111th number covers the period May and June, 1916, the 113th the month of July, 1916, and the 115th the month of August, 1916. Each of these volumes contains appendices, in which are given summaries of the principal events of the War during the month covered by the communiqués in the same volume.

The 112th number is entitled *L'Esprit Français*, sub-title *Les Caricaturistes*; it contains 129 caricatures and illustrations relating to the War, the majority of them by well-known artists.

A Preface is contributed to this volume by Monsieur D'Arsène Alexandre. Risibility is, he reminds us, a prominent trait in man. Even in his direst misfortune this strange faculty at times overcomes all other feelings in an individual. Laughter represents many moods; there is the laughter of him who braves discouragements, that of him who seeks vengeance, that of him who sets another at liberty. There is not only a laughter which gives expression to supreme joy, but there is also the laughter which sounds the keynotes of the bitterest pangs of bodily pain and even of the uttermost depths of infinite sadness. Sorrow too then can be said to possess its share of laughter.

The caricaturist is, says Monsieur Alexandre, if not the judge, at all events a sort of public crier of the verdict passed by the human conscience on matters of public and private interest. His *rôle* is neither useless nor secondary, for there are cases in which it is not sufficient for a wrongdoer to be reviled and classed by the judgment of history as belonging to the race of Cain. It is necessary, and even well, that wrongdoers, who have shown contempt for humanity, should in their turn be held up to contempt contemporaneously, in order that the hideousness of their offence may be brought home to them. Should this punishment be of a kind that evokes laughter, it will but be the laughter of sorrow.

In the same way that the worst of cataclysms give rise, as Victor Hugo has said, in the hours of the night to a long and dismal roar of laughter, so also has the Great War given birth to a series of incidents, the portrayal of the hideousness of which has been productive of the laughter of derision. The sketches portraying these incidents will form an integral part of the history of these stirring times, forming as they do an interpretation of the sentiments of the populace, or those inspired by their moods of the moment. In order to give a bird's-eye view, so to speak, of the public mind, in relation to the prominent incidents of the War, the editors of the *Pages d'Histoire* series have had the happy thought of collecting in one volume some of the more important caricatures and drawings which have been published since the autumn of 1914. The composition in the sketches republished in this volume is in many cases striking and no one can mistake the bite of the artist's sarcasm, the depth of his contempt where he wishes to deride, nor the depth of his sympathy, the sincerity of his affection where he intends to approve the acts and conduct connected with the situations delineated by his brush or pencil. Monsieur Alexandre compares the situation of 1870—1871 with that of 1914—1915. In the former case Paris was soon cut off from the civilized world, and France by an iron wall of besiegers and later by the tragic events of a civil war. French artists practically in a body ceased to ply their trade; the few who continued to contribute

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to the Press had no hold on public opinion. To-day it is different. The artists whose works have been appearing since 1914 are men of high talents whose work has been entirely inspired by the public opinion of France. The sentiments to which they give expression are of the purest, brightest and most soul-stirring order.

Monsieur Alexandre next proceeds to say a few words concerning some of the more remarkable sketches appearing in this volume. In conclusion he states that the French satirists realize that, in order that their works may be of the best, they are bound to be guided by and to interpret the human conscience. The War has not brought about any profound modification in human nature. It has, if anything, exalted the more desirable qualities in man and expelled the less desirable. French art on its humorous side should continue, says Monsieur Alexandre, to depict what is best in humanity, that is to say, it should range itself on the side of the weak. French artists have understood and will understand better as time passes by that if caricature is the mirror for exposing wrongdoing, satire their weapon and laughter one of their forms of punishment, this mirror must sparkle and remain clean, this weapon must be as polished as it is sharp, this punishment rapid, striking, decisive. The caricatures and drawings contained in the volume under review fully reach the standard laid down here.

The 114th number is a Diary of the War, being the fourth volume of this kind in the series; it covers the period 1st January—30th June 1916.

W. A. J. O'MEARA.

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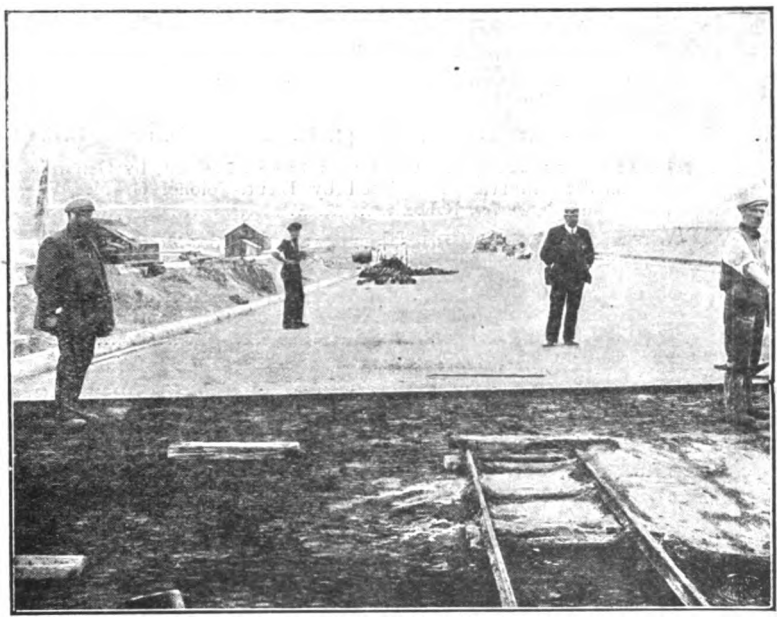

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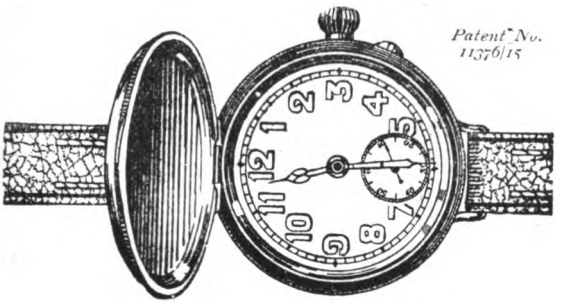

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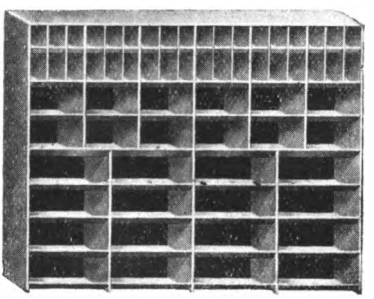

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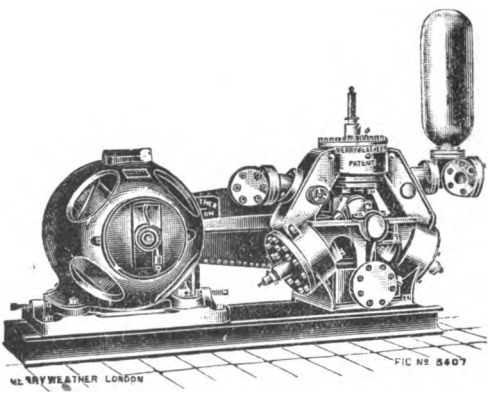

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*DEEDS OF THE ROYAL ENGINEERS.**

(Continued from the May number of the "R.E. Journal").

CHAPTER VII.

THE 23RD COMPANY, ROYAL ENGINEERS, AT LADYSMITH.

THE following account of the company during the war in South Africa is extracted from the *R.E. Journal* of November, 1903 :—

Officers embarked with unit :—Major S. R. Rice (became C.R.E., Middleburg District, May, 1901) ; Capt. G. H. Fowke (appointed Director of Public Works, Transvaal, May, 1901) ; Lieut. E. V. Turner (transferred to 1st Telegraph Division, April, 1901) ; Lieut. H. L. Meyrick (transferred to the 17th (Field) Company, April, 1900) ; Lieut. R. J. T. Digby Jones (killed at Wagon Hill, 6th January, 1900) ; 2nd Lieut. G. B. B. Denniss (killed at Wagon Hill).

Officer attached :—Lieut. R. E. Meyricke (Division Officer, Pietermaritzburg).

Officers subsequently posted :—Lieut C. Mellor (April, 1900) ; 2nd Lieut. G. A. P. Brown (April, 1900) ; 2nd Lieut. N. W. Webber (April, 1900) ; 2nd Lieut. A. W. Stokes (April, 1901 ; invalided home September, 1901) ; Capt. C. de W. Crookshank (May, 1901 ; appointed Staff Captain, Middleburg District, September, 1901, and subsequently Adjutant, Central South Africa Railway Volunteers) ; Capt. R. H. Macdonald (September, 1901); Capt. H. B. Jones (March, 1902).

Up to the declaration of war the company was employed on purely peace work, the principal work being the construction of a hospital.

BEFORE LADYSMITH.

On 15th October, 1899, three days after the expiry of the Boer ultimatum, No. 1 Section, under Lieut. E. V. Turner, proceeded to join the detached force under Major-General Sir W. Penn Symons at Dundee. They were present at the action of Talana, and returned to Ladysmith with the rest of the force on October 26th.

The remainder of the company started work on the construction of defences for Ladysmith, Major Rice being appointed C.R.E.

On the 30th October the company, under Capt. G. H. Fowke, took part in the Battle of Lombard's Kop, as part of the general

* Compiled in the R.E. Record Office.

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infantry reserve under Colonel W. G. Knox, R.A.; it accompanied two mountain guns to Observation Hill, to assist, if possible, the detached column on Nicholson's Nek; it came into action at long range against the enemy posted on the line Surprise Hill, Thornhill's Kopje, etc., and remained in this position until late in the afternoon, when further advance of so small a force was found impossible. Major Rice on this day was in command of Section A (Eastern Force) of the defence.

DEFENCE OF LADYSMITH.

The communications were finally cut on the 2nd November; and from this date until the relief on February 28th, 1900, the 23rd Company (the only R.E. Company with the beleaguered force*) was continuously employed making, adding to, and strengthening the works in all parts of the various sections of the defence.

From an early date in the siege defence work had to be carried on almost entirely by night, and under most unfavourable conditions as to nature of ground and available tools and material. New works, batteries, etc., were located and traced during the day by C.R.E. and the officers for night duty. So long as the number remaining fit for duty permitted, one officer was detailed for duty in each section of the defence. The N.C.O.'s and Sappers were employed assisting section commanders and officers in charge of posts, being reinforced by natives under Mr. King and Mr. Brook, of the Natal Public Works Department. With the rest of the garrison the Sappers became so weak from sickness and starvation that towards the end it was found economical to convey them to their work in wagons for any distance over ¼ mile; in spite of all they displayed such determination and self-sacrifice as to merit the personal thanks of Sir George White, G.O.C., Ladysmith.

A few brief details of work done during the defence may be of interest.

Many emplacements, magazines, bombproofs, etc., were constructed for the naval 4·7 in. and 12-pr. guns and for the 6·3-in. howitzer and R.F.A. guns. For the 6·3-in. howitzer four pairs of sunken and concealed emplacements were built, and one of the 4·7-in. guns had to be shifted eight times.

Seven electrical minefields were established and some 60 mines laid; these consisted of 4½ lbs. of guncotton in waterproof bags, to be fired from one central station in each field. Mines of various mechanical patterns were also put down. There was no opportunity, however, of actually firing either description in earnest.

A line of strong abattis, with barbed wire interwoven, was erected round the south end and west face of Cæsar's Camp and Wagon Hill, extending continuously for some 2½ miles on the southern side of

* Except the 2nd Balloon Section, R.E.

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the enceinte. Entanglements and crinolines of barbed wire were formed round guns, etc.

Two bridges for all arms were constructed across the Klip River. One, near Rifleman's Post, was a low-level one on piers made of boulders and bags of concrete, the roadway being tied down to the piers with strong chains; it successfully withstood high floods washing over it and remained in working order throughout the siege. The other bridge (alongside an existing low-level one called Camp Bridge) consisted of 10 spans of 19 ft. each, the roadway being supported on single trestles weighted with bags of concrete; on January 6th, 1900 (the day of the great attack by the enemy on Wagon Hill), the water rose 3 ft. above the roadway, which had been built 10 ft. above ordinary water level, and the whole bridge was carried away. It was not rebuilt, but the old bridge was repaired and made serviceable.

A wire sling bridge with cage was made at Rifleman's Post to maintain communication during floods; it proved very useful on January 6th in allowing reinforcements to be passed over, when the above-mentioned bridge was under water.

A flying pont was established in February between Poundberg and Pavilion Hill; it was made out of two company pontoons, and worked by a bridle and pulley on a wire cable consisting of seven telegraph wires twisted together, the span being 300 ft.

Two artillery roads were constructed to the top of Cæsar's Camp; also roads to Cove Plateau and to Maiden Castle Redoubt, the latter requiring blasting work along almost its whole length of 800 yards.

Gun Hill Sortie.

On December 7th Capt. G. H. Fowke, Lieut. E. V. Turner, and four N.C.O.'s accompanied a small force of Imperial Light Horse, Natal Carabineers, and Border Mounted Rifles under Major-General Sir A. Hunter (Chief of the Staff) to make a night attack on the enemy's position on Gun Hill. The position being surprised and captured, the R.E. destroyed one 6-in. B.L. Creusot gun and one 4·5-in. howitzer; the charges used in each case were 6 lbs. of guncotton at the muzzle and 4 lbs. at the breech; the destruction in each case was apparently complete, but it is believed that the Creusot gun was made serviceable again in the workshops at Pretoria.

Surprise Hill Sortie.

On the night of December 10th Lieut. R. J. T. Digby Jones with three N.C.O.'s and Sappers accompanied another small column of four companies of the 2nd Rifle Brigade under Lieut.-Colonel Metcalfe of that battalion, which captured the enemy's position on Surprise Hill. On this occasion one 4·5-in. howitzer was destroyed. During the retirement the column was attacked, and the R.E. casualties

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were Sapper Hibbard and 2nd Corpl. Berry wounded, the former mortally.

WAGON HILL.

The following account of the enemy's attack is contained in a report from Major Rice to the Chief Engineer, Natal :—

" Thirty-three N.C.O.'s and men of the 23rd Company left our camp at Ladysmith for night-work on Wagon Hill; Lieut. R. J. T. Digby Jones was the officer in charge. Their duties were to make a second (or upper) emplacement for a naval 12-pr. gun; to assist in mounting a 4·7-in. gun which was coming that night from Junction Hill, in the sunken emplacement already prepared; and to fix a platform in the lower 12-pr. emplacement.

A working party of 50 infantry was also provided for Lieut. Digby Jones. They joined at Wagon Hill without arms, and left at 2.30 a.m. on the 6th on completion of the work required from them.

A party of 10 R.N. under Mr. Sim, R.N., assisted by working party of 100 infantry, was detailed for the movement of the 4·7-in. gun. In addition, an escort of 70 infantry was provided.

The permanent garrison of that end of Wagon Hill consisted of 25 Imperial Light Horse with two officers.

At about 5 a.m. on the 6th a report reached our camp that the enemy were on Wagon Hill and that Lieut. Jones' detachment had been captured. This was the first intimation we (R.E.) had of any attack. The firing of guns had been heard for about half an hour previously, but at that period of the siege this was not an unusual occurrence.

In case of attack the orders were for the C.R.A., C.R.E., etc., to proceed to headquarters. But in view of the report I thought best to ascertain personally what had occurred; so I rode out as quickly as possible, meeting Lieut. Digby Jones on the top of Wagon Hill at 5.45 a.m.

Our men were then lining the front ridge of the plateau (Wagon Hill, W.), exchanging a hot fire with the enemy on their front and left flank; and Major Miller-Wallnutt, Gordon Highlanders, was present and in charge. 2nd Lieut. G. B. B. Denniss, the officer detailed by me for duty with that section of the defences, had already arrived.

Lieut. Digby Jones gave me a very clear and full report of what had occurred within his observation up to the time of my arrival. I have also heard the statements of various N.C.O.'s and men of his party. In the following brief account of what occurred throughout the day I have relied on these reports in connection with anything recorded that did not come within my personal observations.

On the arrival of the various parties at Wagon Hill, West, on the night of the 5th, work proceeded as usual until 2.45 a.m. on the 6th, when, without previous warning, musketry fire was opened on

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them from the outer crest line of Wagon Hill proper, on their left flank, at a distance of about 150 yards.

At that time Lieut. Digby Jones and about 25 of his party were working at the upper 12-pr. emplacement. The remaining 8 were fixing the platform in the lower 12-pr. emplacement at the west extremity of the hill, distant about 70 yards.

Digby Jones at once ordered the party to stand to their arms, which were piled by them; kicked over the lanterns, which were evidently attracting the enemy's fire; extended his men from right to left; and opened fire in return on the place whence they were being fired upon.

The R.N. who were near the 4·7-in. emplacement also stood to their arms under Mr. Sim. The party of Imperial Light Horse also fell in with their officers. Some of the Gordon Highlanders fell in with Digby Jones's party.

Naturally a good deal of hurry and confusion occurred at first; but none of the parties mentioned above ever left, or were driven off, the top of the hill. Both I.L.H. officers were wounded almost at once, and Lieut. Digby Jones took command, remaining in charge of the various parties until 5.15 a.m., when reinforcements (I.L.H. and Gordon Highlanders, under Major Miller-Wallnutt) commenced to arrive.

Shortly after the action opened Digby Jones pushed his men forward about 40 yards, with bayonets fixed, and occupied the outer crest of the hill; the I.L.H. also moved forward; and the R.N. party, with the 8 Sappers, occupied the lower 12-pr. emplacement and the outer crest of the right flank. The reinforcements, on arrival, took up practically the same position and absorbed the original defenders.

In my official report to the Chief Staff Officer I brought to notice the steadiness of the men and the great coolness and resource shown by Lieut. Digby Jones in the trying circumstances in which he was suddenly called upon to act.

I think I may draw attention too in this account to the value of the rule, which obtains in this unit, of never allowing the men, under any circumstances to leave their camp for work without taking their arms with them and of insisting on the arms being piled close to them whilst at work.

Firing on both sides continued heavily before and after my arrival on the spot. We R.E. had several casualties at this time, principally from the fire of a small party of the enemy (about fifteen I was afterwards told), who were lying among the rocks on the left flank, on the outer slopes of Wagon Hill proper, about 200 yards off. Other units suffered equally.

At about 9 a.m. it was decided to attempt to turn out these men by a bayonet charge by the troops on Wagon Hill proper, and at

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Major Miller-Wallnutt's request I formed a section of R.E. and R.N. at the lower 12-pr. emplacement, to support the charge by firing volleys on a knoll about 900 yards on our left front, whence the enemy were protecting by rifle fire their comrades above mentioned. I placed Mr. Sim, R.N., in charge of this party. The attempt was made and failed, Lieut. Todd, King's Royal Rifles, being killed.

Shortly afterwards firing on both sides slackened, and at about 10.15 a.m. ceased almost entirely. The situation then appeared to be that the attack had been completely beaten off. I was informed that it had been decided to leave the small party of the enemy on the outer slopes of Wagon Hill proper until nightfall, when they could be effectually dealt with. They were considered to be cut off from the rest of their forces. This assumption afterwards proved to be wrong, as they could be, and were, reinforced under cover of the banks of a donga which ran almost up to the position they occupied.

At about 11.15 a.m. I rode into Ladysmith to report myself at Headquarters. Before leaving I told Lieut. Digby Jones that, if Major Miller-Wallnutt had no objection, he might collect his men near the 4·7-in. emplacement and give them some food which I had sent in for. This he did; and fortunately so, as the party was re-formed in time for the attack made shortly afterwards.

After reporting at Headquarters I returned to Wagon Hill, arriving there about 1.30 p.m. Near the 4·7-in. emplacement I met some of my men. The senior N.C.O. reported to me that both Digby Jones and Denniss were killed, and that they had had several other casualties.

It appears that about mid-day the attack was renewed. A small party of Boers suddenly appeared within a few yards of the men on the outer crest, about 15 yards from the 4·7-in. emplacement, evidently having ascended unperceived from the lower part of the outer slope. After a few rounds a panic seized the defenders, and they retired in disorder and confusion to the rear crest, and in some cases down the rear slope of the hill.

Two Boers (Field Cornets de Villiers and de Jagers, I believe) then advanced to the 4·7-in. emplacement, in and around which Digby Jones and his detachment were resting and having some food. Apparently the retirement of the infantry defenders had been unnoticed by them, and the first intimation they had of the enemy being on the top of the hill was a shot, delivered over the parapet at a distance of a few feet, which killed 2nd Corpl. Hunt, R.E.

In a moment Digby Jones picked up a rifle, dashed round the end of the epaulment, and killed de Villiers; Lance-Corpl. Hockaday, R.E., at the same time shot de Jagers dead.

Digby Jones was then heard to say, "What's up? The infantry have gone." A man replied, "There is an order to retire, sir."

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Jones said, " I have had no order to retire." A sergeant of the I.L.H., who was near them, said " Don't let's retire, sir, let's give them Elandslaagte again." I think this sergeant's name was Howard, he was killed afterwards.

Digby Jones at once ordered bayonets to be fixed, and, calling on his men to follow him, led them (with Denniss) at the charge, reoccupying the firing line in front of the 4·7-in. emplacment.

Some Boers were seen by our men disappearing down the slope as they advanced. Heavy firing recommenced on both sides.

After a short time the men who had been driven from the front were reinforced and moved forward into their places again. I think it was then that Major Miller-Wallnutt was unfortunately killed, but I am not sure as regards this point. At all events the Sappers were ordered back to the 4·7-in. emplacement, and were gradually withdrawn as the infantry came up. These latter had no officer with them (owing to casualties, I believe), and Digby Jones, acting under orders, went out to the centre of the ridge with the object of moving the men well forward at that point to their proper firing position. While performing this duty he was struck by a bullet in the throat, which killed him immediately.

Shortly afterwards Denniss was heard to say, " I hear Mr. Digby Jones is hit ; I am going to see to him." He was afterwards seen moving about on the sky line carrying a stretcher. I found the bodies of these two most brave and promising young officers lying close to each other about 15 yards in front of the upper 12-pr. emplacement.

On my arrival I re-formed the R.E. in reserve in and around the 4·7-in. emplacement. Firing continued heavily throughout the afternoon, the enemy's guns on Rifleman's Ridge and Middle Hill sending many shells, both common and shrapnel, on to this part of the position. Rifle fire was also heavy, and we had many casualties. At 4.30 p.m. a very heavy rainstorm broke, accompanied by violent thunder and lightning. The firing on both sides, instead of slackening as I expected, became more intense, and it was evident that some crisis was approaching. I therefore ordered my men to fix bayonets and be ready. We did not then muster more than about a dozen all told.

I saw the men in the firing line fall back singly and in twos, until about 5.30 p.m., when I heard confused shouts of " Retire," and the whole line rose and doubled towards the rear crest of the hill. In this retirement I saw several men fall and it seemed as if the enemy had gained the front crest ; I have heard that some were actually on top, but I did not see any myself.

We then pushed to the front and got to the firing line, turning back as far as we could the men who were leaving ; in a few minutes the remainder of the men who had left, being finely rallied by a young

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officer of the King's Royal Rifles (2nd Lieut. Reid, I afterwards ascertained), returned at the charge, cheering and with bayonets fixed, and resumed their positions. I did not see any of these men get behind the rear crest of the hill, and I have no doubt that they were nearly all misled by the shouts of "Retire" to which I have alluded.

After this the fire gradually slackened; and the charge of the Devons on Wagon Hill proper removed the party of the enemy, who, at a range of about 200 yards, had been the cause of most of our losses on Wagon Hill, W. They had completely enfiladed us, and most of our killed and wounded were hit on the side of the head or body.

Nothing further of importance occurred in this neighbourhood, and at nightfall the infantry at Wagon Hill, W., were relieved by dismounted cavalry, 18th Hussars, and 5th Dragoon Guards. A detachment of the former regiment had been brought up to Wagon Hill, W., at mid-day under Major Knox, and were in reserve on the reverse slope of the hill throughout the afternoon, except a small party, under Capt. Haig, which was in the lower 12-pr. emplacement.

At about 6.30 p.m., with the approval of General Ian Hamilton, I sent into Ladysmith for a fresh detachment of 33 N.C.O.'s and men with 2 officers; they were brought out by Lieut. Turner. On their arrival I took what remained of Lieut. Digby Jones's party back to camp, which they reached at 10.30 p.m., after 28 hours' continuous work and fighting.

I returned to Wagon Hill at midnight in anticipation of further fighting, but none occurred.

The names of several N.C.O.'s and men were specially mentioned by me in my official report; and I think it will be admitted that all of Lieut. Digby Jones's party did their duty in a way that reflects credit on themselves and their Corps.

The following were our losses :—

Killed.—Lieut. R. J. T. Digby Jones.
2nd Lieut. G. B. B. Denniss.
Sergt. C. Jackson.
2nd Corpl. R. Hunt.
Lance-Corpl. H. Bailey.
Sappers Simmons, Bland, and Cox.

Wounded.—Sappers McCarron, Powell, Catchpole, Hudson, and Rutt."

The relatives of Lieut. Digby Jones were subsequently awarded the V.C. for which he would have been recommended had he survived.

During the siege the company lost 2 officers and 8 N.C.O.'s and men killed in action, and 12 N.C.O.'s and men died of disease.

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DESIGN FOR A HORSE-WATERING POINT.

By MAJOR ARTHUR A. CROOKSHANK, R.E.

HORSE-WATERING places may be divided into two kinds, the muddy mouth type and the not quite so muddy mouth type. Watering points built during months when there is not much humidity in the atmosphere do not give much trouble; when the floor or standing breaks up and gets bad the trough can be picked up and shifted a short distance along the pipe line.

In the damp months however it is necessary to provide a hard flooring; cases have occurred of horses being drowned in the deep liquid mud which the ground is very rapidly converted into.

The flooring in this design is of forest timber—2 in. thick if of inside cuts, and 3 in. thick at the corners if of outside cuts—founded on three long ground sills with chalk filling in between. This flooring is sloped inwards at 1 in 20 to a corrugated iron drain, which also takes the drips and spills from the water trough, and the rain water.

The trough is of sheet iron, made in continuous lengths of 25 ft. and of full cross section throughout. The top edges of the trough have to be made strong against both horizontal pressure by the horses and vertical pressure by the men using them to mount off.

Troughs made of tongued and grooved boards are difficult to make watertight; those lined with waterproof canvas, or ordinary canvas tarred or roofing felt are seldom watertight for long, and also have a short life, as the lining soon gets holed or rubbed through.

Troughs made in short lengths of 12 to 15 ft., and connected by piping or otherwise choked or throttled down, are not satisfactory, as they take longer to fill, and therefore reduce the rate of watering and output of watered animals.

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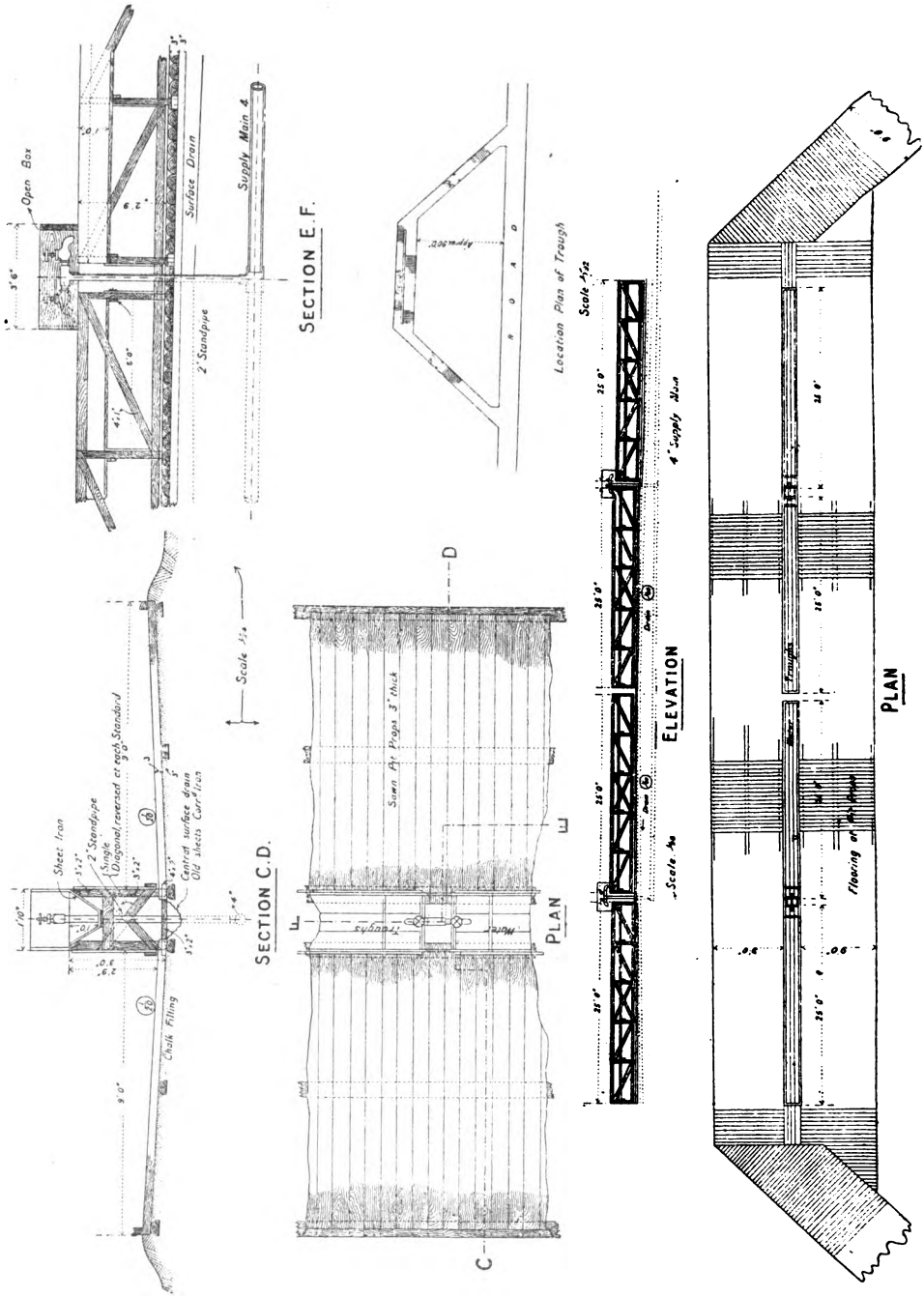
WATERING POINT FOR HORSES.



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DESIGN FOR BILLET BED.

By MAJOR ARTHUR A. CROOKSHANK, R.E.

THE inevitable result of a long period of movement-less warfare is that the standard of comfort, luxury or what are considered as necessaries is always being raised; each winter it is higher than the last, and the third winter finds it at its limit.

Furniture is a dangerous subject to discuss from the R.E. point of view, but in any case, this design, which is by Major A. C. Finnimore, R.E., is a very good illustration of the fact that in engineering it is always worth while, it always pays (and indeed it is necessary) to work out and think out the smallest details, even in the smallest items, so as to be thorough all through, and to arrive at efficiency with the minimum expenditure of material.

The bed is made of 4 in. × 1 in. planking throughout, this being the only timber which was available at the time; the four corner posts or legs are made of angle wood, the two central legs of tee wood; all the legs are tapered down from top to bottom. The runners or bearers are placed on the skew, the inclination should be a tangent to the curve which the double wire netting assumes when it has finished stretching and has taken up its permanent set. Placing the bearer at an angle also gives it the required horizontal strength.

The central legs are made 1 in. shorter than the others. This gives the bed a spring, makes it pliable, and consequently much more comfortable; it also prevents rocking when the floor is uneven. The tapering in the legs also reduces the chances of rocking.

This same principle (of shortening the central support) is applied when designing billet benches or forms.

Perhaps one of these days the Finnimore school of furniture will be as well known as the Chippendale, Sheraton, or Adam schools, in which the practical utilitarian side of furniture was rather lost sight of, and everything sacrificed to the decorative and æsthetic sides and to art (in some cases so-called art).

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CROSS SECTION ON A-B

FRONT ELEVATION.

PLAN.

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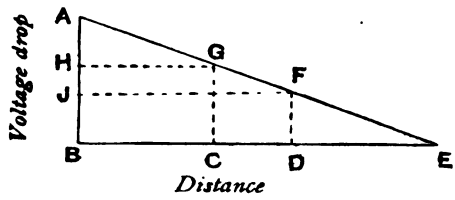
OHM'S LAW GRAPHS.

By MAJOR A. D. ST. G. BREMNER.

AT many stations small electric-lighting distribution schemes for camps or barracks, etc., have often to be prepared where the source of power or feeding point is on or near the site. These schemes are usually on the two-wire system and generally include a main cable, two or three sub-mains and several branches therefrom, each with different lengths and currents. A total permissible voltage drop at full load from the source of supply to the furthest lamp has first to be decided upon, in order to prevent undue variations of the potential differences at the lamps, when some are not switched on, causing the candle powers to vary excessively.

This drop may be about 2 per cent. to 4 per cent. of the supply voltage according to the nature of the installation. Probable extensions of the system should always be allowed for and this can be suitably effected by reducing the permissible drop decided upon by the percentage of probable extension.

Having fixed the total drop permissible, the difficulty is then to apportion this satisfactorily and economically to the several parts of the system. It usually entails much calculation and juggling of cables mingled with trial and error to get the various drops correct and even then one is never certain that the most suitable and economical arrangement has been obtained. There is, however, a very simple method, which is never stated specifically in text-books, and it is based on the principle that the most economical arrangement of any small distribution scheme on the tree or branching system, as opposed to the ring or network system used in larger schemes, is obtained by making the voltage drop vary directly with the length of the cable, no matter what the current may be which that cable has to carry.



To explain this principle more clearly, in the above figure let AB represent the total permissible voltage drop, and BC, CD, DE be the

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respective lengths of the main, sub-main and branch cables. These cables will of course have different currents in them at full load according to the nature of other branches coming off. We must consider the longest portion which will give the greatest drop. Join AE, erect perpendiculars at C and D, meeting AE at G and F respectively, and draw GH and FJ parallel to BE. Then AH represents the voltage drop for cable BC, HJ for cable CD, and JB for cable DE. It must be noted that the size of cable required to obtain the permissible drop is nearly always larger than that necessary to carry only the maximum current at full load.

At the end will be found a sheet of Ohm's Law Graphs devised by the author some time ago, which gives the solution of the above problem graphically and also other simple problems in Ohm's Law. The examples given with the diagram clearly explain the method of its use.

For voltage drops with alternating current it will give sufficiently accurate results for practical purposes.

As the nature and nomenclature of service cables is more or less in the melting pot at present, no service identification of the cables shown is given, but the sizes of conductors are easily identified and include practically all the cables that can be obtained within the limits specified.

It should be noted that the current-carrying capacities are for rubber insulation. Other insulating materials entail a slightly different carrying capacity.

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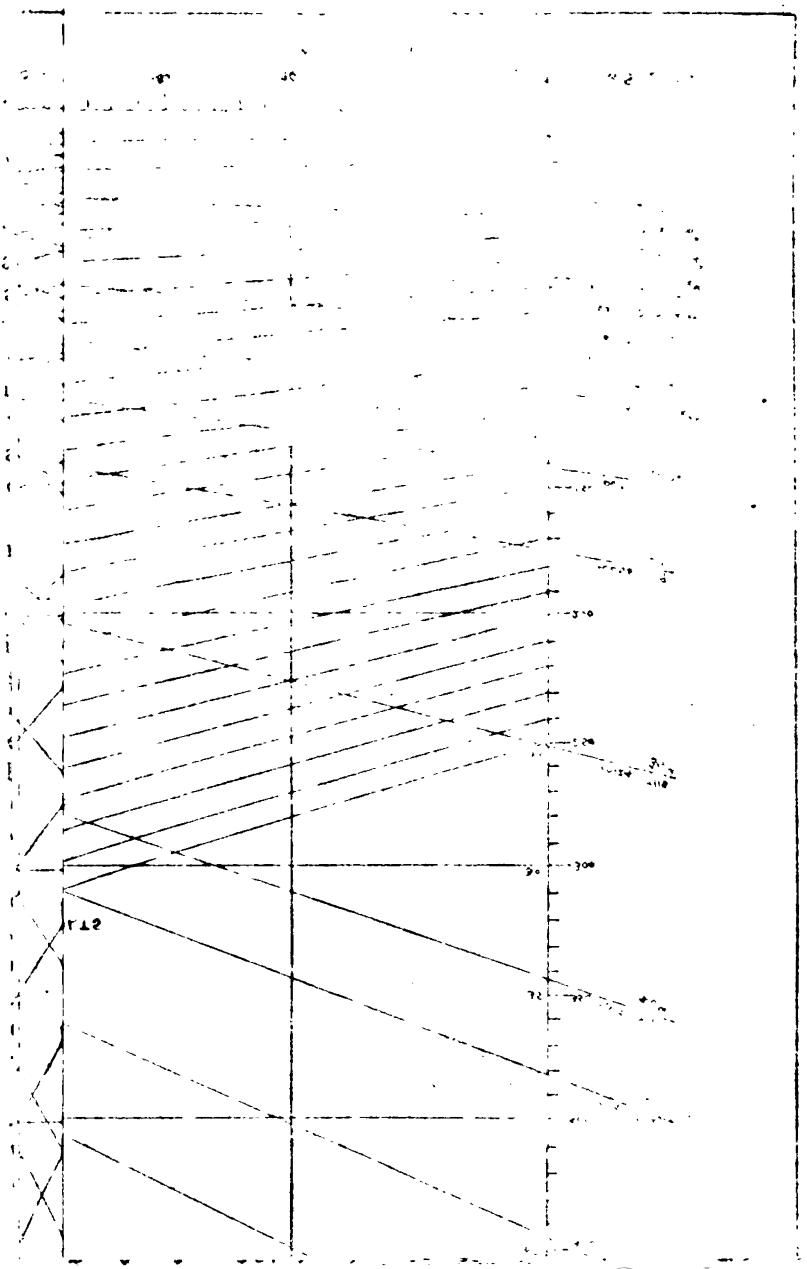
GRAPHS—



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MEASURES TO BE TAKEN TO PREVENT CONTAMINATION OF FOOD BY FLIES.

By JOSEPH CATES, M.D., D.PH., M.O.H., St. Helens.

THE following valuable paper was read at a Sessional Meeting of the Royal Sanitary Institute at St. Helens, February 17th, 1917.

Whatever view we hold with regard to the so-called fly campaign, we shall be unanimous in agreeing that there is only one natural cause of death, old age. If we agree to this, we shall further agree that children should not die, for the death of a child is not a natural death. Thirdly, we shall agree that children should not be poisoned by the food they take. The majority of deaths from food poisoning in children is brought about by gross contamination of food by flies. This interesting conclusion may be arrived at by the study of the number of deaths from summer diarrhœa occurring in England and Wales in the different quarters of the year. Food infection gives rise to disease under many names; the two outstanding symptoms of food infection in children are sickness and diarrhœa. With regard to the magnitude of the latter is it a disease which causes two or three deaths in a district or can it be looked upon as an important slayer of children? There is no doubt that if we consider the figures this disease is a wholesale slayer, and the need for doing everything possible to combat it is urgent. It is estimated that the average worth to any community of a single life is £250 to £300, consequently every district is to that extent poorer when a life is lost. A simple calculation will show you that the loss of children's lives from summer diarrhœa since the beginning of the twentieth century, sixteen years, has cost this country about £100,000,000. With reference to these deaths from infective enteritis there is another important point, and that is the illness caused by the disease. Not only is death a loss to the community, but illness is also a serious loss. The illness from summer diarrhœa is very much larger than most people suppose. I doubt very much whether in an industrial town like St. Helens one thousand persons during the summer escape an attack of infective enteritis. The disease is at its height in the third quarter of the year, when flies are most active, and as they become inactive the deaths disappear.

When local authorities have abolished the open ashpit, they will have done a tremendous amount in breaking the link between the

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infective child and the clean healthy children. We have seen during the past eight or ten years what is, in my opinion, a most regrettable step in health matters. The first retrograde step was taken when a second Government department took upon itself, or had thrust upon it, matters relating to public health. We saw the medical inspection of school children placed under the Board of Education. A little later there was another sub-division of health work; one disease, important, but no whit more important than many diseases that were passed over, was picked out and placed under a special committee for treatment, viz., tuberculosis, at the time the National Health Insurance Act was passed. Later on we saw certain other diseases singled out for treatment and placed under other committees. Later still another branch of health work has been split up and placed under another committee, viz., infant welfare work. I feel that we can carry sub-division too far, and the point will arise when we come to the sub-division of the unit, and by-and-by in health matters we shall be dealing with decimal points. The formation of special committees might even be extended to measles and whooping cough, and I view with very much alarm the institution of such new bodies dealing with public health. There will probably be later on a condition which the writer of the Athanasian Creed perhaps had in mind when he said there would be a dividing of the substance and a confounding of persons, and I implore those who have influence in this matter to do anything they can to get public health matters gathered together and placed under one central authority.

Every year in England and Wales some 23,000 deaths occur from diarrhœa and enteritis, and of this number about 20,000 are in children under five years of age. Since the beginning of the century a population larger than that of Bradford has been destroyed by these preventable diseases. Few diseases are more easily within the control of local sanitary authorities, and none reflects more clearly municipal shortcomings. Unpaved yards and passages, ill-swept streets, infrequent removal of house and stable refuse, the so-called conservancy system, the earth-closet and the open ashpit, each plays a part in swelling the total of the slain.

If sanitation is without influence on the rate at which children die, how comes it that towns notoriously insanitary have an infant death rate four or five times that of clean well-governed cities, that in the certain overcrowded slum areas the children die six times as rapidly as those in better-class residential districts, that among 1,000 infants born to unskilled labourers only 700 survive the first year of life, while out of the same number of births 960 babies of professional men reach their first birthday?

If the causative organism of diarrhœa and enteritis is to be found in decomposing filth, particularly that of human origin, why does the death rate from these diseases suddenly increase during the third

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quarter of the year? The answer has been supplied by the investigations of Niven and other workers in the field of preventive medicine, who have shown that a prevalence of flies is closely followed by an increase in the number of deaths from summer diarrhœa, and that as the flies disappear, or become inactive, the epidemic passes away.

In considering the question of prevention, due regard must be given to the three fundamental factors of the soil, the seed, and the sower; the soil is the infant, the seed the infecting organism as yet not certainly discovered, the sower is in most instances the fly.

In the first place, it is our duty to attempt to improve the condition of the soil so that it will resist the growth of the seed, and to this end a child should have the right to suitable and sufficient clean food, adequate periods for sleep, a properly ventilated bedroom with no overcrowding, and skilled medical treatment, with skilled nursing assistance.

Secondly, we must do all in our power to reduce the prevalence of the seed by converting the earth-closet and open ashpit to the water carriage system, by insisting on the provision of closed ashbins instead of the open ashplace, the paving of yards, the effectual cleansing of streets and passages, and the regular and frequent removal of refuse.

Further, recognizing that the heavy mortality in the summer and autumn is occasioned by direct contamination of food by flies, it is essential vigorously to attack this important channel of infection.

There are about twenty species of house-frequenting flies, but the common house fly and the lesser house fly seem to make up over ninety per cent. of the fly population found in houses during the height of the fly season.

A female house fly will lay about 120 eggs in one batch, and may lay four or five batches. The eggs are deposited in clusters on the surface or just below in fermenting vegetable matter or in refuse which is likely to ferment; hatching of the larvæ occurs within four days, and may be as rapid as eight hours if the temperature of the refuse is sufficiently high.

Immediately the larvæ issue from the eggs they burrow out of sight. About eight days later the white crawling maggot becomes a pupa, but the larval stage may in some cases be prolonged for eight weeks. The flies emerge from the pupæ within eight days, and the females may be laying eggs three weeks from the time that the eggs from which they were hatched were deposited. The part taken by the fly as the sower of infection is largely mechanical; while assiduously walking over filth and fæcal matter the fly gathers on its legs and footpads disease-producing germs, and then contaminates the surface of the material on which it next alights. Moreover, the fly

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feeds upon particles of decomposing matter, and thus its alimentary canal becomes a store house from which bacteria are distributed.

Obviously the first step in the control of fly-borne disease is to prevent flies from breeding. Stable manure must therefore be stored in fly-proof receptacles, which must be emptied at least once a week during the summer and autumn. Other likely breeding places must be searched for and appropriately dealt with. House refuse must be placed in closed ashbins, emptied at frequent intervals, and the contents destroyed by fire. At the onset of warm weather an organized attack must be directed against the first fly of the season, and the nooks and crannies of houses, stables, and other outbuildings must be explored for the presence of the foe.

To free a house from flies there is nothing equal to the sticky fly paper of narrow width, or lengths of wire or string dipped into some suitable adhesive substance. Wire cages or glass vessels baited with attractive material can be kept in each room, and those possessing the necessary energy should knock down flies on the wing with suitably constructed weapons. A little paraffin added to the water with which windows are cleaned is an excellent deterrent, and the paintwork may be wiped over with a cloth moistened with the same liquid.

All food, particularly substances such as milk, sweets, and fruit which are consumed without cooking, should be screened from contamination by flies.

In houses some protection can be afforded by a suitable fly-proof safe or food cupboard, and by metal or gauze screens.

In shops fly-proof windows and glass cases can be used, and muslin screens freely employed. In certain trades more use should be made of cold storage chambers, and meat and fish during the summer months ought not to be exposed to the dust and dirt of streets.

Fortunately the knowledge that there is danger in the consumption of food contaminated by flies is no longer confined to those engaged in public health work, and the day is not far distant when purchasers will refuse to enter a shop where flies may be seen crawling over the articles offered for sale.

The presence of flies constitutes a grave menace to the health of the people and the life of the children. Typhoid fever, dysentery, summer diarrhœa, and enteritis, some forms of tuberculosis and many other diseases can be conveyed by flies, and it is imperative therefore that local sanitary authorities and every householder should strive to remove one of the most serious dangers that an infant has to face.

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MEMOIR.

LIEUT.-COLONEL JAMES HALIFAX WESTERN, C.M.G., LATE R.E.

On April 2nd, 1917, Lieut.-Colonel J. H. Western, C.M.G., late R.E., leaving a fine record of useful work behind him, went to join his former chiefs in the rest which they all have so well earned; or, perhaps, to planes of higher activities which may suit their energetic natures better than rest. It is just a year since Sir Colin Scott-Moncrieff, his chief in India and Egypt, had left before him. His other chiefs, General H. A. Brownlow, Colonel W. H. Greathed and Colonel J. G. Forbes, had gone on more in advance—all names of renown in the irrigation records of India.

Colonel Western was born in 1842. After passing through the R.M.C., Addiscombe, and receiving his commission in the Royal Engineers, he went to India in 1862, and a year later commenced his career as an irrigation engineer of the Indian Government on the Eastern Jumna Canal, N.W.P., under Sir Colin Scott-Moncrieff. From 1870 to 1875 he was Executive Engineer of the Northern—the most important—Division of the Ganges Canal. Here he left his mark by the improvements he effected in the head works on the Ganges at Hardwar, including the construction of the regulating dam across the river branch opposite the town. In addition he carried out protective measures on the large cross drainage works, and the remodelling of the numerous falls on the first 50 miles of the Ganges Canal, with other subsidiary works.

At the end of 1875 he was selected to succeed Colonel Helsham-Jones, R.E., on the construction of the Narora Weir on the Ganges River opposite Aligarh, and of the first reach of the Lower Ganges Canal—very extensive and difficult works, which he, endowed with the experience gained on the Eastern Jumna Canal, completed with great success. Referring to this period of Colonel Western's Indian career Colonel E. W. Creswell, late R.E., writes in terms of admiration of his untiring energy and of his great powers of administration and practical foresight; and adds this testimony: "Major Western won the respect and devotion of all those who served under him, and no greater testimony can be adduced to his tact and manage-

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ment than the fact that happiness and contentment always reigned at Narora."

Colonel Western, as Superintending Engineer, was next put in charge of the new Betwa Canal, and consequently was responsible for the construction of the great Paricha Dam across the Betwa River, near Jhansi. Here he displayed his sound judgment in altering the site of the dam from that originally chosen, after much discussion, to a site where the river was of wider section and sound rock offered itself for a foundation.

In 1882 Colonel Western was transferred as Superintending Engineer to the Punjab Irrigation Branch, where he was the prime mover in the satisfactory development of the distribution system on the Sirhind Canal. He held this appointment till he was lent, at Sir Colin Scott-Moncrieff's special request, to the Egyptian Government.

Mr. J. S. Beresford, C.I.E., who, with Colonel Creswell, has supplied the foregoing facts of Colonel Western's career, adds the following appreciation of him :—" The general feeling of all who knew and had worked with Western in Northern India, was that of great respect for his judgment and ability. In difficult situations, when there was little or no reliable information to go on, he seemed to have the faculty of always taking the right course." Colonel Sir John W. Ottley, K.C.I.E., writes that whatever Western had to do, he did well ; and mentions his habit of rising at unearthly hours in camp and starting long before dawn, so that it became the custom to announce the departure to the wives left behind in bed by calling out " Fine starlight night and all's well."

It was in consequence of the high reputation which Colonel Western earned for himself as an engineer in India that Sir Colin Scott-Moncrieff selected him to superintend the work to be undertaken in Egypt with the £1,000,000 that, in 1885, the Great Powers, on the urgent representation of Sir Evelyn Baring (afterwards Lord Cromer), allowed Egypt to borrow for irrigation works. So Colonel Western came to Egypt bringing with him the late Mr. A. G. W. Reid as his able assistant.

The most important work in Egypt was then, as now, the barrage at the apex of the Delta. The barrage—now called the Delta Barrage—consists of twin regulators, one astride of either branch of the Nile, immediately below the point of its bifurcation into the Rosetta and Damietta Branches. Its construction was begun in 1843 and it was nominally finished in 1861. When tested with a head of water in 1863, and again in 1867, water passed under the floor and the collapse of the work was threatened. Consequently the barrage was put on the sick list and finally reckoned unfit for service. So it was found by Sir Colin in 1883. It served as a bridge across the Nile to the convenience of traffic, but not as a regulator

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of river levels and discharges in the service of irrigation. After some experimental tests of a practical nature in utilizing the barrage as a regulator, made by Sir William Willcocks from 1884 to 1886, and after an examination of a certain length of the foundations under Colonel Western's direction in 1886, it was decided to do the bold thing and undertake the restoration of the whole barrage and to render it capable of holding up a four-metres head of water. This is no place to describe the work of restoration, but the following quotation from a Note by Sir Colin will serve to indicate, in a general way, the difficulties that had to be met :—

" (1). All the time we were mending this barrage, we were obliged to be using it. The great head of water held up made it doubly difficult to keep the springs down to give a dry floor to work on. If we had been building a new work, or if we could have postponed irrigation till the barrage was ready, our task would have been much easier. It was like mending a watch, and never stopping the works. (2). Our working season was always a very short one. The state of the river flood never allowed us to begin till November. The first thing was to enclose the portion to be operated upon by great earthen banks. These banks had in one case to be made in water 50 ft. deep. They took always more than two months to make. Then the water inside had to be pumped out. We were lucky if this was finished and the new work could begin by the 1st March. Then it continued without intermission, day and night, till the end of June, when we had to prepare for another flood. It was clear we could never shut off the whole stream from either branch at the same time, and in one working season we could not repair the whole of either barrage ; so the work divided itself naturally into four seasons, half a barrage each season."

The work was finished in 1890, and the barrage was returned as fit for duty and active service. For the successful completion of this most difficult work Colonel Western and Mr. Reid were both made Companions of the Order of St. Michael and St. George, honours thoroughly well earned. Later on, in 1909, Colonel Western was awarded the 1st Class Medjidie by H.H. the Khedive.

Unfortunately Colonel Western's health broke down in 1889, and in February, 1890, he left the Egyptian service, a few months before the final completion of his work. On his return to England he became Inspecting Engineer to the Egyptian Government, which post he held till 1909.

After he had left Egypt, he was, nevertheless, always consulted on important matters affecting the barrage and his advice was invariably followed. The peculiar operation of consolidating the barrage foundations by cement grout, for instance, was not undertaken before his approval had first been sought and obtained.

In Egypt, as in India, Colonel Western earned the reputation of

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being a sound and safe man. The Irrigation Staff from Sir Colin downwards placed great confidence in him. His advice was ferquently sought by seniors and juniors alike, and was readily given to either. It was felt that to seek and follow his advice was to adopt a factor of safety that would give security against all risk of failure. He had a profound dislike to anything approaching self-advertisement, and esteemed such ceremonies as official inaugurations of works to be but vanity. He was content to do good work—the best work, and to know that it was good.

HANBURY BROWN, *Major, late R.E.*

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REVIEWS.

PAGES D'HISTOIRE, 1914—1916.

(Librairie Militaire Berger-Levrault, Paris: 5, Rue des Beaux-Arts).

Continued from R.E. Journal for May, 1917.

The 116th number of this series is entitled *Leurs Crimes*; it is published under the patronage of the mayors of a number of French towns. An introductory notice to the volume has been contributed by Monsieur L. Mirman, Prefect of the Department of Meurthe et Moselle, Monsieur G. Simon, Mayor of Nancy, and Monsieur G. Keller, Mayor of Luneville. These gentlemen inform us that this volume is a book of horrors, but alas, it is at the same time a book of truth. The contents of the volume have been culled by them from the three following sources:—

(1). The four reports of the French Commission of Enquiry relating to the Violations of the Laws of War by Germany published by the French Foreign Office.

(2). The two volumes containing the 22 reports of the Belgian Commission of Enquiry and the reply of the Belgian Government to the German White Book of the 15th May, 1915.

(3). The notebooks taken from the persons of a large number of wounded German soldiers, N.C.O.'s, and officers who fell into the hands of the French and from others of the same ranks taken prisoners; these documents are exceedingly valuable as containing the recorded confessions of the experiences, etc., of the writers thereof and form veritable *pièces à conviction*.

The volumes referred to above represent a formidable charge sheet against the German Army and authorities, and although it is desirable that every page they contain should be carefully studied, nevertheless it is recognized that their very bulk places them out of the reach of the public at large. However, in order that this public may have some idea of the nature of the contents of the reports in question extracts have been made therefrom and are republished in this little volume so as to be accessible to the widest circle of readers.

The volume is divided into nine sections headed as follows:—

(i.). They have stolen.
(ii.). They have committed arson.
(iii.). They have committed murder.
(iv.). They have done violence to women and children.
(v.). They have killed the wounded.

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(vi.). They have taken shelter behind women.
(vii.). They have made their civil prisoners suffer martyrdom.
(viii.). They have, in order to provide excuses for their conduct, lied against and calumniated their enemies.
(ix.). Conclusion.

The pages of this volume make sad reading and their perusal excites the deepest indignation against the perpetrators of the dastardly acts chronicled therein. No punishment, known to civilized people, seems to be sufficiently severe to mete out either to the miscreants who are responsible for instigating the deeds recorded in this volume or to those who actually committed these deeds.

In the section headed *Conclusion*, the compilers of this volume state that their first object in giving prominence to the information contained therein is not that of inciting French soldiers to commit similar atrocities; reprisals as a means of revenge they consider to be unworthy of them. They seek rather to expose the atrocious side of the Teuton Monster, in order that measures may be adopted to prevent him from repeating the offences which he has been guilty of committing in the name of *Kultur*. They have a second object; their countrymen owe a sacred duty to the memory of those who have been martyrs in their cause. When the War is over it will not be sufficient to commemorate the names of these martyrs on tablets of stone or of brass. As soon as liberated humanity resumes its normal labours the Germans, it is expected, will reappear in every sphere of commerce, industry, finance and science in all those regions where men congregate; then will be the time that the countrymen of these martyrs will need reminding of the deeds committed by the invaders of Serbia, Belgium and France in the years of Grace 1914—1916. To accept the advances of those—and their descendants—who have been guilty of the offences brought to light would be to betray these martyrs; thus to forget them would be an act of complicity in the deeds which caused their terrible sufferings. If these deeds are remembered by future generations in Belgium and France there is, at least, some hope, that a striking moral reparation will be obtained in respect of the dastardly conduct of the German Army and authorities which has been so strongly reprobated in the original reports referred to earlier in this review.

The 117th number is entitled *Lille*, 1916, and is practically a reproduction of the Second French Yellow Book. A preface has been contributed to this number of the series by Monsieur Henri Welschinger, of the *Institut de France*. This preface is in itself in the nature of a review of the Second French Yellow Book which opens with the instructions, dated 25th July, 1916, issued by the French Foreign Office to the Diplomatic Agents of the Republic, directing them to call the attention of the Powers to which they were accredited to the treatment which the German authorities had meted out and were meting out to the people of Lille, Roubaix and Tourcoing, treatment which was in direct violation to the provisions of the Hague Conventions.

Monsieur Welschinger tells us that, amongst the official documents relating to the present War, one of those to which the greatest importance

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must be attached is the Note of the French Government addressed, on the 27th July, 1916, to the Neutral Powers. The text of this note is published in the Second French Yellow Book and is reproduced in the volume under review. In this document are contained the charges made by the French Government in relation to the execrable acts of violence committed by the German authorities against the people of the Departments of Northern France in the occupation of the German Army; these charges are supported by sworn statements, many of which are reproduced textually.

Monsieur Welschinger examines and comments upon the atrocious proceedings directed against the unhappy people who have temporarily come under the rule of the Hun. The French Government have on frequent occasions been obliged to make representations to the Neutral Powers in regard to the offences, opposed to the dictates of humanity, which have been committed by German troops. For example, on the 22nd August, 1915, the French Foreign Office informed the Spanish Ambassador at Berlin that French subjects were being employed on war work and had to submit to an iron discipline of the most arbitrary nature, and to acts of violence and cruelty of the most odious kind. The measures most recently adopted by the German authorities, it is pointed out, are still more inhumane. Under the orders of General Grævenitz, assisted by the 64th Infantry Regiment, sent expressly from Verdun for the purpose, 25,000 French subjects, consisting of girls, young women, and men belonging to every grade of society were torn from their homes at Tourcoing, Roubaix, and Lille and were brutally separated from their families. These wretched people were forcibly employed on agricultural and other work in the Departments of the Aisne and Ardennes, and it was given out that they had undertaken such work voluntarily, a misrepresentation of facts which caused them to be subjected to insults and maltreatment. Details are given of the measures adopted by the Germans for rounding up, collecting and despatching these unhappy people from their native towns to unknown destinations. These unfortunate people appear to have been subject to worse treatment in the matter of the railway accommodation provided for them, than would be permitted in connection with the movement of cattle in this, or any other, civilized country. The Germans have justified their action by alleging that the measures adopted were forced upon them by the difficulties created by the attitude of Great Britain in provisioning Belgium and northern France. The true facts of the situation are that Germany alone is responsible for the privations being suffered by the population in the occupied territory, and she has systematically utilized the labour of these unfortunate people to serve her own ends and to derive the fullest profit therefrom in the interests of her army. She has deliberately violated every engagement into which she entered in connection with the Hague Conventions.

The selection of the persons who were to be expelled from Lille, Roubaix and Tourcoing was left in the hands of military officers at these places, and by all accounts they acted with a refinement of cruelty one would not have expected to find in the educated classes of any country. Machine guns were drawn up in the streets to intimidate

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the victims of these acts of aggression; young girls, brought up in refined homes under the most careful supervision, were herded with women of the lowest moral character; the time chosen for this forced exodus was Passion Week. It is said that in spite of the brutality of the soldiers and the vulgar jests of the officers the French people, in the area under eviction, behaved admirably. Naturally, here and there, some of the less educated of the people gave vent to their exasperation, as in the case of a labourer's wife, who, on being torn away from her husband and children cried aloud: "Cursed be your race, your women and your children."

To add to the misery of the unhappy people thus driven from their homes, the poorest fare was supplied for their sustenance; a small quantity of mouldy black bread, thin dirty soup, and a small portion of tough meat. The appeals of the hungry people for eatable food were met by their gaolers with jeers and the frequent repetitions of the three words: *Das ist Krieg*. They were also told with derisive mockery that their labour would be rewarded in *Bons payable by Monsieur Poincaré*.

Untrue accounts have been issued of these proceedings by the German Government in order to mislead the public in neutral countries as to their real nature. The German Press naturally supports the measures adopted by the military authorities, and a Hamburg paper has not hesitated to record its opinion that *it is not the duty of the German Government to feed people who have been abandoned by their own government.* The *Tag* has even gone further; it has expressed the view that in war *the greatest absence of scruples is in fact the highest degree of humanity. Hesitation and temporization, sensitiveness and consideration are unpardonable weaknesses. Decisive action taken without scruple represents force and therein resides victory.* Mathias Erzberger, who is responsible for the foregoing views, was awarded the Iron Cross for his courage in proclaiming the same. The foregoing views are but a repetition of the maxims of Treitschke, of Von Bülow, of Von Bernhardi, of Delbrück, of Lasson and of many another apostle of Germanic *Kultur*.

Monsieur Welschinger asks whether, in face of the foregoing abominations committed by the Germans and disclosed once again in the New Yellow Book, Neutral Powers will still maintain an attitude of indifference? In one country, at all events, the patience of the public is being exhausted. A large body of Swiss have presented a petition to the President and Council of the Helvetic Confederation, in which they protest against the deportations and other violations of the Law of Nations by Germany.

There are indications that in other neutral countries also the record contained in the French Note, of the 27th July, 1916, has caused feelings of revulsion against the cruelties practised by the Germans.

The King of Spain has personally intervened on behalf of the inhabitants of Lille, Roubaix and Tourcoing, and it is hoped that the hard lot of the unhappy people will have been somewhat mitigated owing to his intervention.

The greater part of this volume consists of Appendices containing the evidence in support of the charges laid by the French Government in the Note in question.

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The 118th and 121st numbers contain the official communiqués issued by the Central Government to the provincial authorities in France; they are the XXIII. and XXIV. Volumes of the series dealing with this matter. The 118th number covers the communiqués issued in September, 1916, and the 121st number those issued in October, 1916; each of these numbers is provided with Appendices, containing information relating to the principal events occurring during the month covered by the communiqués contained therein.

The 119th number is entitled *Autres Chants de Soldats*. Monsieur A. Sauvrezis provides an introduction to the Soldiers' Songs contained in this volume; he reminds us that *a sad army would indeed be a sorry army* to put one's faith in. He asks the question: "Why are we fighting?" And replies: "Because a foreign people claim to impose upon us their material and moral yoke; they claim to dominate, to be masters of our territories and of our thoughts. We will liberate, by a military victory, our invaded provinces—and with no less of ardour, we will liberate our intellectual existence."

He tells us that the literature and the works of French genius give proof of French personality; the popular music of France, with its accents of sincerity, reveals more than anything else the character of her people. In the years preceding the War, musical art seemed to be losing itself in France in useless complications and excessive subtleties; the War, with its terrible realities, has rescued it from the false path into which it was straying.

"In order to think with precision, man should," says Monsieur Sauvrezis, "always place himself at the threshold of his tomb."

"Song," he continues, "does not die with the man; every living being is impelled towards song to give expression to his joy, to his sorrows, to his aspirations whether heroic or religious."

Music is not something superficial; it can give expression to the whole gamut of human sentiments. It can indicate that which is most noble, the most inspiring, the most mysterious in the soul of man. Consequently, in this cataclysm, at a time when so many human beings are living so near the brink of life, music plays a most important *rôle;* it keeps life company, it intensifies it and renders it more harmonious. The following are the maxims which Monsieur Sauvrezis inculcates:—

"Soldiers, if ye are sad, sing, your sorrow will be dispelled by your song.

"Soldiers, if ye are marching, sing, the kilometres will slip away with your song.

"Soldiers, if ye are weary, sing, your blood will course more quickly with the rhythm of your song.

"Soldiers, if ye are merry, sing, the old exuberance of France will be revivified with your song.

"Soldiers, if ye charge, . . . still continue to sing, victory will be the more enduring and the more telling in accompaniment to your song."

This volume contains 46 songs, composed between 1260 and 1916, each song being accompanied by the score of its tune; among them being included the National Hymns of Poland, Portugal and Roumania.

The volume concludes with a short note on military bands.

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The 120th number is a reproduction in French of the Second Serbian Blue Book. It contains the text of the Note addressed by the Serbian Government to the Signatories of the Hague Conventions and calls their attention to the violations of the Law of Nations committed by the German, Austrian and Bulgarian authorities in the Serbian territories occupied by the troops of the Central Powers. Some 169 documents are attached as Appendices to this Note; they consist of extracts from newspapers and letters and of copies of affidavits bearing on the outrageous treatment meted out to the people of Serbia by the authorities temporarily in control of the destinies of this unfortunate country. A veritable reign of terror has existed in Serbia; the subjects of this State have been deprived of their rights and their property; and the invaders have also destroyed and pillaged the national literary and art treasures.

The Serbian Government has, in consequence, felt obliged once more to enter a protest against the misdoings of the Huns and their Allies and to appeal to the sentiments of justice and humanity of the civilized world, in the hope that an amelioration in the unhappy lot of the Serbian people may result therefrom.

The 122nd number is entitled *Les Commandements de la Patrie* and contains the text of an address given by Monsieur Paul Deschanel at the *Institut de France* in the name of the *Academie Française* at the public meeting of the latter held on the 25th October, 1916.

Monsieur Deschanel in this address tells his audience that the essential duties of Frenchmen, the commandments of their motherland are: Remain united; know Germany better; cause France to be better known; never forget; be foreseeing.

He continues: "Let us listen to the sounds that are wafted from the trenches and the sepulchres of our dead; the sounds which come thence carry the note of deep affection. Never has the French nation been a more united family than at the present time. Frenchmen were following different roads, these have met at the summit of a mountain. There exists to-day the same devotion, the same ideal in all. The heroes facing death one and all recognize that as each of them makes his last great sacrifice on this earth, with the passing of his life, which is but a short-lived flame, there is lighted another flame and one which is immortal. And yet the enemy does not understand that what has appeared to be tearing us asunder is really that which has united us: the passion for Right."

Monsieur Deschanel states that he does not know whether the expression "class divisions" still retains the meaning which it conveyed to those who gave it birth; but, he points out, never before has the greatness of poverty and the duty of riches stood out more clearly than at the present time. There are those who have and there are those who deserve to have; it is these two that make up the patrimony of a people. The small white crosses which sprinkle the fields from the Marne to the Seille and from the sea to the Vosges, where the dead lie, are the emblems of equality; may they bring together those that are living!

Turning to the second of his commandments, Monsieur Deschanel asks: "Will the War, which has taught Frenchmen to know themselves

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better, also teach them to understand Germany better? For two years past, a mass of literature has been poured forth to throw light on the present situation and what has led up to it—but this has come somewhat too late! At each new invasion, France has awoken out of a sleep and exclaimed: 'What! Is this Germany, the Germany of Schiller and of Goëthe!' The ignorance of peoples concerning the ideals of one another of necessity leads to misunderstandings; they might well, under such conditions, have been dwelling in different planets."

It is his environment on earth that forms the character of man. Prussia, it has been said by Monsieur Lavisse, is a German State situated beyond the frontiers of Germany. Being without frontiers herself, she has thought that in order to live she must be continually attacking others. Her motto has been: Increase or perish. The term *Prussia* has become synonymous with the word *Conquest.*

Monsieur Deschanel tells us that Germany, in order to save herself from anarchy, has placed herself under the tutelage of Prussia. Germany has been built up by Prussia; her unity, such as it is, has been brought about by war and cemented by conquest.

The doctrine which has the first place in German philosophy is that Germany is acting in the name of the Eternal One; she must exterminate all evil and she claims that to effect her purpose she herself may do evil in order that good may be the result. Every German philosopher and every German historian has added some new formula to this accepted doctrine of Germany. Fichte has said that the German is "*Allman*"; he thus proclaims the pre-eminence of the Teuton; Hegel has insisted that the State must be "venerated as a god" with the most absolute obedience; Treitschke has maintained that the highest duty to the State lies in the development of its power, even if this should involve the repudiation of treaty obligations; Nietzsche has advocated the use of brute force and has given birth to the idea of the "Superman"; Lamprecht has conjured up the vision of a State possessed with tentacles, a vision which has been subtly made use of by Delbrück in the new German Law regarding naturalization; generals from the period of Clausewitz to that of Von Bernhardi have preached to the German soldier that the more "frightfulness" he practises in war, the more humane will war become. With regard to these formulæ, Monsieur Deschanel exclaims: "What a fromidable arsenal of sophisms!"

German historians are the principal politicians in the Empire. Whilst giving an account of the past of the nation, they have been inculcating lessons as to the future. "The German," says Monsieur Deschanel, "is a being wrapt up in history. He lives with his gods and with his ancestors. He flatters and exalts himself in virtue of their accomplishments. Hermann is as much to him as Hindenburg. Verdun is, in his eyes, the most important of French fortresses, because it acquired a recognized status by the Treaty which put an end to the Empire of Charlemagne. He is always seeking revenge for the deeds of Louis XIV. and Napoleon. He is for ever in conflict with the damned civilization of the Latins, that world of perdition!"

The campaign of 1870 was but a step in an elaborate process which had been completely worked out. In 1909, Kaiser Wilhelm II. is

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reported to have said to Von Schlieffen, the general who was responsible for the plan of campaign on which the German moves of 1914 were based: "The Treaty of Frankfort is but a truce." There was really no secrecy as to the designs of the German military authorities; the construction of purely strategic railways towards the Luxemburg and Belgian frontiers, the military service Laws of 1911, 1912, and 1913 voted by acclamation in the Reichstag and hundreds of books published on German aims told anyone, who was able to understand the meaning of acts and words, what it was that was brewing. Germany's preparations were completed betimes and a pretext for declaring war alone was wanting.

Shortly before the Austrian ultimatum was delivered at Belgrade, Theodore Schiemann had written: "In order to start a war against France, it is only necessary to let Austria loose on Serbia." Heed having been given to the promptings of Schiemann, the world has during the past two years and more witnessed the conduct, by the apostles of Kultur, of a war against combatants and non-combatants alike with such ferocity and cruelty as is not to be found recorded in the annals of military history of any previous age, however uncivilized it may have been.

To-day, in every quarter utterance is given to the phrase: *German militarism and the Prussian military caste must be destroyed.* But in spite of the ridicule and condemnation to which the privileges and abuses of this caste have been subjected in the Press, on the stage, in romance, aye even in the Reichstag, we all know, says Monsieur Deschanel, how the Zabern affair ended. It is felt in Germany that her army has been responsible for her independence; it has been the guarantee for the power and wealth of the Empire. Germany is proud of her army and views it with deep affection; she worships it as if it were a deity. Like unto the German Army is the Germany nation. In order to bring about a change in the former a complete reconstitution of the latter must first be effected.

Monsieur Deschanel proceeds to deal with the third of his commandments by pointing out that if it is necessary for Frenchmen to know Germany better, the more so is it necessary that they should cause France to be better known.

Bismarck has dared to refer to the sons of France as "an effete people"; whilst William II., his master, has labelled them "a degenerate people." It is to the sons of the same France that has given the world a Pasteur, a Berthelot, a Henri Poincaré, a Renan and a Taine that these epithets have been applied. It is the sons of this same France who, in the interval between two great wars, have built up a Colonial Empire which ranks as the second in the globe. In spite of the calumnies and intrigues of her enemies France has risen to the requirements of the situation and has taken rank amongst the great Powers of the world. In every field of activity her sons have contributed to the progress of civilization. Contemporary Germany certainly claims to be supreme in the fields of science; but the fact remains that Germans have proved themselves imitators rather than inventors. France has never had any reason to be envious of Germany; she can claim as her own many of the most distinguished men in every branch of science, they have at all times at least taken the leading position in medicine, surgery and physiology.

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The most recent inventions of our own times, namely wireless telegraphy, automobilism, aviation owe much to the fertile brains of the genius of France.

Monsieur Deschanel points out the part that the members of the *Institut de France* have played as *Ambassadors of Ideas* in connection with their visits to America, Great Britain, Russia, Italy, Switzerland, Roumania, Sweden, Norway and Denmark. They can, he urges, never be engaged on a more profitable task than that of causing peoples of foreign lands to know better France, her character, her customs, her family life, all that beauty of her Greco-Latin culture, which has given birth to the heroism and virtue of the French race.

Monsieur Deschanel in concluding this part of his subject remarks that in the course of preceding centuries mighty Empires have crumbled away, one by one, since they were unable to bear the burden of their greatness. It is this fact that provides the assurance that the Public Right of Europe will be once more avenged by just retribution being meted out to the disturber of the peace of the old world. Force is to Right what the body is to the mind; life circulates in the body but it is the mind that governs.

This volume concludes with a few remarks on the duty of Frenchmen never to forget and the duty to be foreseeing. Monsieur Deschanel says: "For us, Frenchmen, the protection of our frontiers is the most important of all matters. So long as German Armies remain within a few days' march of Paris, as they have done for three and forty years, there can be no tranquility in the world. France has in the past too easily forgotten the tortures to which she has been subject each time the Vulture of mid-Europe has cast a shadow over her fair provinces. *Generosity* is the term which has been applied to this readiness to forgive and to forget. Nothing can be urged against generosity towards an honourable enemy, but in the Entente camps to-day, generosity towards those who have made the great sacrifice, and those who may yet make it, has to be most borne in mind, particularly in view of the methods adopted by the enemy of to-day to gain the advantage.

Monsieur Deschanel reminded his audience that 16 years earlier he had in the same hall uttered the following caution:—"Keep your eyes on the Balkans. Study the valley of the Vardar. A duel between the German and the Slav is impending. France will be drawn into the fray. Stand united, be prepared!" Continuing, he proceeds: "A people whose military spirit is on the decline is as good as condemned to death. Certainly, against Germany we will continue to defend arbitration; could it but have avoided a war, it would have been a precious institution; but it presupposes a sanction, that of force. A force which all those who are not willing to submit to the yoke must put their shoulders to the wheel to organize."

Germany has been in the habit of annually celebrating Sedan Day. Let France, says Monsieur Deschanel, celebrate in future the 4th August, that memorable day on which her children unitedly set their seals to a deed of great import. Let them do this in memory of the immortal meetings on the Marne and at Verdun. To forget would be a crime. But, France never will and never can forget.

W. A. J. O'MEARA.

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SPONS' ELECTRICAL POCKET-BOOK.

By WALTER H. MOLESWORTH, M.I.E.E.—(Published by E. and F. N. Spon, Ltd. 6s. net).

In a short Preface the author tells us that his book is written for practical engineers who may seek for general information, etc., on electrical subjects, and at the same time he further defines the scope of the volume under review by pointing out that it does not include matters more particularly pertaining to telegraphy, telephony and special branches of electricity.

Compilers of books of reference of the class under review frequently appear to experience considerable difficulty in deciding what information they shall include in and what exclude from their works with the consequence that *pocket-books* so-called often do not comply with the designation their authors apply to them. The author of the work under review has been able to strike the happy mean and has thereby provided an extremely portable handbook.

The pocket-book under review contains, *inter alia*, tables giving British and foreign weights and measures, logarithms, trigonometrical formulas, graphic and international symbols (the text being in English, Italian and French), useful information relating to the heating of air and of water by electricity, tables relating to the resistance and carrying capacity of wires, weight and calculated size of conductors (all systems), systems of transmission, cost of same, poles, etc., for transmission lines, testing apparatus and methods of use, continuous current circuits and machinery, calculation of corona and corona losses, etc., electrical data in relation to alternating current circuits, alternating current machinery, generation costs, etc., primary batteries, stationary accumulators and accumulators for vehicles, electric furnaces, illumination of streets, etc., incandescent and arc lamps, data relating to electric traction and the costs of various systems, including tramways, trackless and other road motor vehicles and railways.

The "B.O.T." Regulations relating to overhead lines, and those relating to tramways and light railways are given in the pocket-book *in extenso*, as also are the guard wire regulations for the protection of the Postmaster-General's plant and the I.E.E. Wiring Rules, 1916. The pocket-book further contains a useful list of the laws and regulations in force relating to electric lighting, etc., and the names and addresses of publishers and booksellers where the Acts of Parliament and other publications referred to can be readily obtained. The information contained in the volume is up to date and from the brief summary of the synopsis of its contents given above it will be evident that all who have to deal with practical problems connected with the transmission of electrical energy and with the utilization of this form of energy for lighting, traction and electro-chemical purposes will find much that is useful in the pocket-book to assist them in their daily avocations.

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NOTICE OF MAGAZINE.

REVUE MILITAIRE SUISSE.

No. 2.—February, 1917.

ON CAVALRY.

The *Revue* article is illustrated with Sketch Maps of Belgium and of Northern France.

In an editorial note it is stated that the following works have been drawn upon for information :—

La guerre sur le front occidental. By J. Reinach.

La guerre au jour le jour. By Lieut.-Colonel Rousset.

La grande guerre. French Official Communiqués.

L'action de l'armée belge. Belgian Official Account (*vide R.E. Journal* for November, 1915).

3,000 *kilometer mit der Garde Kavallerie Division.* By Dr. Vogel (Army Chaplain).

Histoire illustrée de la guerre de 1914. By Gabriel Hanotaux.

The author of the *Revue* article refers to the difficulties that all who desire to make a contribution to the history of the Great War experience at the present time, owing to the absence of positive and absolutely reliable information concerning the major incidents of the Campaign now in progress ; in consequence, he does not pretend to draw any definite and precise conclusions concerning the part played by cavalry in the present Conflict of Arms on the Continent of Europe. His object in writing at the present juncture is to dispel the legend concerning the " bankruptcy of cavalry," a legend that finds currency in some quarters.

It is stated that in spite of the meagreness of the information which is available, it can nevertheless be definitely claimed that whenever cavalry has been employed in the Great War it has accomplished all that was ever expected of it.

At the time that the present War broke out many important and interesting questions affecting the employment of cavalry were on the *tapis*. The question was being discussed, for instance, whether in a Continental Campaign great raids would be carried out by cavalry corps, accompanied by cyclists and specially equipped technical troops, or whether cavalry would find it necessary to operate within easy distance of infantry support.

Again, in connection with cavalry reconnaissances, the question was still being debated whether the employment of complete squadrons or that of patrols was likely to achieve the best results. It was further an open question whether reconnoitring parties could be pushed to

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great distances from their main bodies, as in 1870, or whether the sphere of their activity would be more confined.

In equal doubt was the question whether cavalry would be able to deliver an effective charge on a modern battlefield.

To each of the questions stated above an answer can be found in the records relating to the main incidents of the War; such answers may not be such as to allow a final opinion to be formed on the subject, but the information available is sufficiently complete to remove many of the doubts which troubled cavalry leaders. Raids, on a large scale, have been conducted in this War, for example, by cavalry under General Sordet in Belgium and by German cavalry in the Russian Theatre of War. Cavalry has, at times, been employed in the Western and Eastern Theatres considerably in advance of main armies, and, at times, it has operated within close supporting distance of infantry. This War has also shown that the days of the active intervention of cavalry on the battlefield have not yet entirely passed away. Numerous cavalry charges have taken place, as for example those on the Marne; further, Broussilof's Cavalry has been employed in pursuit of a retreating enemy under conditions which the most ardent cavalryman did not dare to dream of as a possibility. Finally, dismounted action by cavalry has been almost a matter of daily experience.

The author of the *Revue* article examines in some detail the part played by the 2nd and 4th Divisions of Von der Marwitz's Cavalry Corps. These divisions operated in advance of the right wing of the German Army which invaded Belgium; they crossed the frontier east of Gemmenich on the 4th August, 1914, and advanced on Visé with the object of forcing a passage across the Meuse there. They found that the bridge at Visé had been destroyed and that a battalion of the 12th Belgian Infantry Regiment had taken up a position to oppose the passage of the river at this point. The *terrain* being favourable this small infantry force was able to hold up the German cavalry. However, a brigade of Hussars was quickly sent to Lixhé, below Visé, and effected a crossing by the ford at this place. This manœuvre on the part of the German cavalry not only turned the left flank of the force guarding the passage at Visé, but also practically opened the way for cavalry reconnoitring parties directed on Antwerp and Brussels. The Germans were soon in possession of both Lixhé and Visé; the river was quickly bridged at both these places and German columns were pushed across with the object of cutting off the Belgian Army, in position on the Gette, from Antwerp, its base.

On the 4th August, 1914, German infantry advanced guards were within easy supporting distance of the 2nd and 4th Cavalry Divisions. These divisions reached Visé at midday, and at 4 p.m. the infantry vanguards of five different German Army Corps had reached the line Bombaye-Herve-Remouchamps. Bombaye and Herve are respectively 3 and 6 miles from the Meuse. The short distance which separated the cavalry from the infantry was in this instance naturally due to the proximity of the Meuse to the German frontier in this neighbourhood.

On the same day (*i.e.* 4th August, 1914) the 9th Division, also be-

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longing to Von der Marwitz's Cavalry Corps, crossed the frontier, probably in the neighbourhood of Malmedy. After passing the Salm, between Stavelot and Vieil-Salm, it was directed on Marche (west of the Ourthe), reaching this place on the 6th August. This division was probably intended to cover the concentration, in the neighbourhood of St. Vith, of the 3rd and 4th German Armies, and then to act as a screen to the westward of the troops engaged in the attack on Liège. It is probable that it was some patrols of this division that came into contact with Belgian Lancers at Plaineveau on the 5th August.

On the 14th August, the 1st (German) Cavalry Corps (Guards and 5th Divisions) arrived in the region south of Liège; the 9th Cavalry Division, being no longer required where it was, crossed the Meuse and joined the 4th Cavalry Division in the region Gembloux-Wavre, co-operating with it till the 18th *idem.*

By the 6th August, the concentration of the Belgian Army had been effected in the quadrilateral Tirlemont-Louvain-Wavre-Perwez, and on this date it was holding the line of the Gette; at the same time the 3rd (Belgian) Division was retreating from Liège on the river last named. The Germans had by the 18th *idem* collected 11 Army Corps in front of the Belgian Army, being particularly strong on the latter's flanks.

The German cavalry formed an almost impenetrable screen to the Army Corps referred to above and overlapped the flanks of the Belgian position. Owing to its numerical superiority this cavalry force was able to carry out the task allotted to it with the greatest ease, although the first attempts of the German 2nd and 4th Cavalry Divisions and a couple of battalions of Chasseurs to outflank the left of the Belgian Army on the Gette met with a check—a Belgian Cavalry Division, consisting of 2,400 sabres, 400 cyclists and 12 guns, on the 12th August held up a German force composed of 4,000 sabres, 2,000 rifles and 18 guns at Haelen. After this check, some change seems to have taken place in the *rôle* assigned to the German 4th Cavalry Division, for mention is made of its presence in the vicinity of Gembloux and Wavre on the 16th *idem*, where it had linked up with the German 9th Cavalry Division. Up to the 18th *idem* cavalry skirmishes took place in the region last mentioned, the purpose of which is not yet clear. It is probable that the task assigned to the two German Cavalry Divisions in question was to cover the advance of the German III., VII. and X. Army Corps which, having crossed the Meuse between Liège and Huy, was marching on to the line Jodoigne-Namur. It was at this period that the French and German cavalry came into collision near Perwez, when the former had to give way.

On the 18th August the German cavalry took an active part in the fight at Tirlemont, capturing two field pieces and two machine guns. The date last mentioned was a critical one for the Belgian Army which, being hard pressed on its front and flanks by a force much superior to it in numbers, was obliged to withdraw from the line of the Gette. Three German Army Corps were, at this time, advancing against the Belgian left between Diest and Tirlemont; the right of these Army Corps was covered by the German 2nd Cavalry Division then marching westwards between the Grande Nethe and the Demer. The presence

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of patrols of this cavalry division at Aerschot (N. of Louvain), on the evening of the 19th *idem* had come to the knowledge of the Belgian General Staff.

It was the serious danger arising from the presence of this German force, threatening as it did to cut off the Belgians from Antwerp, that led to the retirement of the Belgian Army first to the Dyle and later on Antwerp.

During this phase of the War the German 9th Cavalry Division followed the retreating Belgians; advancing *viâ* Ottignies on Brussels, it passed through the latter city on the 20th *idem* and without halting there proceeded westward.

The German 2nd Cavalry Division seems to have acted throughout as a flank guard on the extreme right, covering the advance of the German I. Army on Brussels; it advanced directly on Ostend, whence the whole or a part of it was deflected in a south-westerly direction. It reached Alost on the 21st August. There is no trace of the independent movements of the German 4th Cavalry Division at this time: it was perhaps co-operating with the 9th Cavalry Division, to which the task had been allotted of covering the front of the German I. Army. At the time that the events to which reference has been made were taking place a considerable German cavalry force appeared at Condroz, south of Liège; it proved to be the 1st Cavalry Corps under Von Richthofen, consisting of the Guards and 5th Cavalry Divisions.

The order of battle of the German Guards Cavalry Division is given in the *Revue* article.

The 1st Cavalry Division, amounting to 10,000 sabres, had the duty assigned to it of traversing the Ardennes, with the object of reconnoitring the line of the Meuse towards Dinant. It crossed the Eifel, without mishap, covering from 19 to 25 miles per diem, and reached Laroche on the 11th August. Two reconnoitring squadrons had been pushed from Ettlebrück, on the 8th *idem*, towards the line Dinant-Namur. Neither of these squadrons appears to have succeeded in accomplishing the task assigned to it: one of them did not get beyond Rochefort, south of Marche. Both these squadrons, which were reinforced by half a company of cyclists, remained in telegraphic communication with their main body. Numerous patrols were pushed forward by these squadrons and these came into contact with French patrols sent out by Sordet's Cavalry Corps which had arrived on the Ourthe on the 7th or 8th *idem*.

In order to ascertain what was taking place on the line Namur-Givet and probably also to clear the way for the advance of the XII. (Saxon) Army Corps, the German cavalry undertook a reconnaissance in force towards Dinant on the 15th *idem*. After a temporary success the German cavalry was thrown back by troops of the French 1st Army Corps, which had just arrived in the neighbourhood of Dinant. This cavalry retired along the right bank of the river and was several times engaged, between the 16th and 19th *idem*, in the neighbourhood of Sovet, the object of the engagements being to clear up the situation.

On the date last named Von Richthofen decided to abandon his attack

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on Dinant. The XII. (Saxon) Army Corps had in the meantime arrived on the scene and entered the fighting line.

Therefore it may be said that the German cavalry on both flanks, at Haelen and at Dinant, simultaneously met with checks (on the 12th and 15th August).

The author of the *Revue* article points out that the attack of the German cavalry on the Meuse was an enterprise of considerable magnitude; that it did not succeed is not surprising, for it is to be remembered that it is always a difficult task for troops, however strong in numbers, to force the passage of a river line presenting strong tactical features and defended by a large force of all arms.

The check met with by Von der Marwitz's Cavalry on the right of the German advance is less easily explained. The author of the *Revue* article suggests that the Germans, if instead of wasting time at Haelen when they found that they could not brush aside the Belgians met with there on the 12th August, had quickly decided to make use of the mobility possessed by a mounted force and had made a wide sweeping movement on Zelk, then but feebly defended, they might have met with considerable success.

After leaving the neighbourhood of Dinant Von Richthofen's Corps received orders to cover the left flank of the XI. (Saxon) Army Corps during its march on Namur. It moved *viâ* Brabant and Huy and, passing to the north of Namur, reached Charleroi on the 23rd August, just as the fighting was ending there. It was thereupon ordered to maintain connection between the German VII. and XI. Army Corps.

During the progress of the Battle of Charleroi five German Cavalry Divisions were north of the line of the Sambre and of the Meuse: as follows:—

2nd Division on the right bank of the Dendre, reconnoitring towards Lille; 4th and 9th Divisions in the neighbourhood of Tournai and Condé, on the Scheldt; the Guards and 5th Divisions, somewhat to the south and in rear of the 4th and 9th Divisions.

On the 24th August, the advanced parties of these divisions were on the line Pitthen (N. of Courtrai), Tourcoing, Lannoy and thence southward on Lille as far as the Douai region. Little information is available concerning the movements of these divisions after the date mentioned, except that it is known that the greater part of Von der Marwitz's Corps was on the 25th *idem* in the Cambrai region.

At the same time Von Richthofen's Corps crossed the French frontier at Sars-Potteries.

A period of great promise for the German cavalry appeared to have arrived. The enemy beaten at Mons and Charleroi was retiring southwards. Now was the time for the cavalry to harass the enemy during his retreat.

Von der Marwitz's Corps remained on the German right wing and pushed forward from Cambrai on Marcoing, reaching the latter place on the 26th August. Thence it reconnoitred towards Combles and Peronne. On the 29th *idem* it was at Albert and on the day following near Roye. It will thus be seen that this Corps during the period in question was covering the front and right flank of the German II. Army Corps

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which formed the right wing of the I. Army. The German II. Army Corps had not taken part in the Battle of Mons ; it marched *viâ* Condé on Cambrai and on reaching the line Bapaume-Peronne, on the 28th August, came at once into collision with the French 7th Army Corps, which had been brought by rail from Alsace to form a new French army. The French Corps was compelled to withdraw to the southward.

On the night of the 31st August—1st September, the cavalry with the German I. Army marched through the Forest of Compeigne in two columns. Early on the morning of the 1st September it came into collision with the British rear-guards on the southern borders of the forest. The German 4th Cavalry Division was on this occasion somewhat roughly handled by the British troops ; it lost half its artillery and was so shaken that on the day following it was not able to take part in the engagement near Senlis in which the German 2nd and 9th Cavalry Divisions participated with the leading troops of the German II. and IV. Army Corps. The 3rd September was spent by the Germans in reorganizing units, in shoeing horses, etc.

On the 4th *idem* the 2nd and 9th Cavalry Divisions took part in the wheel of the German right wing to the south-east, which caused Von Kluck's Army to be directed on to the Marne ; they reached Ferté-sous-Jouarre that evening. The 4th Cavalry Corps had apparently not yet recovered sufficiently from the mauling it received on the 1st September to take part in further active operations ; it was relegated to form the flank guard of the German IV. Reserve Army Corps, at that time just north of Meaux.

On the 5th September the German 2nd and 9th Cavalry Divisions continued their southward march and, after passing Coulommiers, were heading for Provins ; however, at midday, an order arrived directing them to halt. They probably passed the night at Coulommiers, for on the morning of the 6th *idem* they were engaged in this neighbourhood.

The Battle of the Marne was about to begin.

Von der Marwitz's Corps was abreast of Von Richthofen's Corps and operated on its left. To it had been assigned the task of pursuing the British troops in their retreat to the line Valenciennes-Maubeuge. During the pursuit this cavalry had daily brushes with the British rear-guards. At Marbais it took 100 prisoners ; the Chief of the Staff of the Corps was killed at this place. Patrols varying from a dozen men to a troop were constantly employed, at great distances from their main bodies, by this corps.

On the 28th August this Corps came into collision with the French 10th Territorial Regiment at Urvillers and near St. Quentin, which had only just arrived on the scene. The Territorials seem to have been roughly handled by the Guards Cavalry Division which, it is said, captured a large number of French prisoners on this occasion. Reinforcements rapidly came to the assistance of the French Territorials. A British squadron of Hussars drove back a German squadron ; but the Anglo-French force was compelled to retire on Hurlu. This German cavalry captured Golancourt (S. of Ham) and forced the British to continue their retreat ; the latter had intended to make a stand at Guiscard.

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One German squadron was now sent forward to reconnoitre the lines of the Oise and the Aisne with the object of selecting points at which these rivers should be crossed.

On the 30th August Von Richthofen's Corps arrived at Noyon. The patrols sent forward by it had been unable to obtain the desired information. In consequence, the Guard-Jägers and a part of the 5th Cavalry Division were pushed forward ; cyclists being specially detailed to force the passage of the river. The German patrols ascertained that the town was not defended and also that the Bailly Bridge was intact. This Corps then crossed the river, part at Noyon and part at Ribécourt, and on the same day continued its march, being directed on Soissons. On this date an officer's patrol succeeded in doing considerable damage to the Soissons-Paris railway.

The German cavalry had received orders for the 1st September directing a reconnaissance towards Château-Thierry. It was held up for a time by the stubborn resistance made by French troops holding Soissons ; the French were, however, finally forced out of the town by the fire of the German artillery. They retreated southwards and were pursued by the German cavalry which reached Branges, about 8 miles S. of Soissons. An engagement of short duration took place with a French rear-guard near Fresnes (S. of La Fère), on the following morning ; soon after it had ended an order reached this cavalry from Von Bülow to cross the Marne near Jaulgonne. This move was successfully carried out ; the river being crossed after a short dismounted action on the part of the advanced guard of the German cavalry.

On the 4th September Von Richthofen's Corps should have marched on Montmirail, but it could not do so as the roads were blocked by troops of the German VII. and IX. Army Corps advancing southwards by forced marches. The German I. Army met with resistance at Cambrai on the 26th August ; at Peronne and other places to the south of Bapaume on the 28th *idem* ; Lanrezac's Army made an attempt at Guise and at St. Quentin to hold up the march of the German X. Army Corps, but the Germans continued to make rapid progress and were much assisted by the vigorous attacks of their cavalry on the enemies' rear-guards. The Germans pushed on from the Aisne to the Marne. The German cavalry moved across country and reached the neighbourhood of Vieils Maisons, some 5 miles south of Château-Thierry ; it was now abreast of the leading troops of the German II. Army and on their right. On the 5th September Von Richthofen's Corps outdistanced the German II. Army, and reached the region south of La Ferté-Gaucher on the Grand Morin and had the German IV. and III. Army Corps (belonging to Von Kluck's Army) on its flanks. The Guards Cavalry Division was astride the road to Provins and the 5th Cavalry Division was in its right ; the two divisions occupying a front of 3 miles. This cavalry Corps had not experienced any serious difficulties on its southward march. As a rule as soon as its artillery came into action against the enemy's rear guards, they began to continue their retreat. This cavalry was also closely followed by the German infantry. Although the task was not difficult the cavalry, says the author of the *Revue* article, played their part well.

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The cavalry with the German I. and II. Armies had opened the way for the infantry by continually treading on the heels of the retreating enemy. The passages on the Aisne, on the Oise, on the Marne and on the Petit and the Grand Morin were always seized in good time, owing to the bold handling of the cavalry advanced guards. Where bridges had been destroyed by the enemy the cavalry pioneers restored communication with rapidity, as, for example, at Noyon.

The reconnaissance duties allotted to the cavalry were also well executed. The cavalry covered on an average from 29 to 25 miles per diem; considering the amount of fighting which had to be done by it, there is little to complain of as regards the rapidity of its advance. It was at all times in a fit condition to perform its duties on the battle-field; the horses though tired were never exhausted and the *morale* of the troopers was excellent.

The losses suffered by the cavalry were nothing extraordinary. The Germans attribute the relative smallness of the casualties suffered by their cavalry to the bad marksmanship of their enemies.

The tactics employed by the Germans to turn the enemy out of positions held by them consisted in sending forward battalions of Chasseurs for the frontal attack, supported by dismounted troopers on each flank, whilst at the same time mounted troops attempted a wide turning movement, the artillery being at the same time employed to shake the *morale* of the defenders.

This method of attack always resulted, it is said, in large numbers of prisoners being taken by the German cavalry. The cavalry advanced guards, it should be noted, were generally accompanied by cyclists and machine guns.

French and Belgian reports make frequent references to the transport of German infantry by motor-cars, which was thus able to keep up with the cavalry; the German accounts are, however, silent on this point.—(*To be continued*).

TSING-TAO.

The *Revue* article, which is illustrated by a sketch-map of Tsing-Tao and vicinity, deals with the Japanese operations of 1914 against the German troops in the Shantung Peninsula. The circumstances under which Germany acquired a commercial Base, in 1897, in the Far East, owing to the murder of two German missionaries by Chinamen, is briefly touched upon. By the Treaty of 6th March, 1898, Germany obtained from China a 90-years lease of the territory at the entrance to the Gulf of Kiao-Chow, and of the islands and waters of this Gulf; she also secured the exclusive right to build railways and to work the mines in the Shantung Province. Kiao-Chow, the Capital of this Province, was not included in the lease; in consequence the Germans converted Tsing-Tao, a fishing village, situated on a peninsula north of the entrance to the Gulf, into the Capital of their Concession. This village soon developed into an important town, half German and half Chinese. In 1914 its population was 40,000 souls; it possessed a University, a Chamber of Commerce, many hotels and villas. Indeed, it had, by the

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year last mentioned, already become an important commercial and industrial town, and served as a seaside resort for Americans and rich Chinese. When the European War broke out Tsing-Tao was full of visitors, but as soon as the mobilization was ordered in the first days of August, 1914, the visitors, except the Chinese, fled. Their places were taken by German reservists who flocked to the place from China and Japan; at the same time, the German troops at Pekin and Tientsin were also withdrawn to the Shantung Peninsula.

The German population at Tsing-Tao felt safe, as the fortifications at this place were considered to be sufficiently strong to hold out for the period of the War against any fleet which either Great Britain or Russia might detach for operations against Germany's Chinese Colony—it was assumed that the War would be of short duration. From the date of the declaration of war, thousands of Chinese coolies were employed to strengthen the German defences on the peninsula. It was expected that Japan would assume a complacent attitude towards Germany.

Great was the consternation therefore when, on the 16th August, 1914, the Japanese Government handed the German Ambassador an ultimatum demanding :—

(i.). The immediate withdrawal or disarmament of German ships of war in Chinese and Japanese waters and (ii.) the unconditional surrender to Japan of the leased territory held by Germany from China.

As rats desert a sinking ship, so did the Chinese desert their Teutonic masters, except in the case of a few loyal employés. The Germans now probably realized that their position was an almost hopeless one ; the Governor of Tsing-Tao had but 5,000 men under his command.

No reply was sent to the Japanese ultimatum ; a state of war between Japan and Germany came into existence on the 23rd August. On the 27th *idem* Admiral Kato declared a blockade against the Germans. At the beginning of September, a Japanese Army Corps disembarked on the Shantung Peninsula and laid siege to Tsing-Tao, which capitulated on the 7th November. Events in Europe had so completely diverted attention to the fields of Flanders and Antwerp, that the operations in the Far East passed almost unnoticed. Details are given in the *Revue* article concerning the German defences on the Shantung Peninsula. The principal line of defence on the land side was situated from 1½ to 2 miles from Tsing-Tao and consisted of five closed works connected by a continuous line of parapet.

The closed works were constructed for garrisons of from 200 to 300 men. They were provided with bomb-proof casemates, the overhead cover of which consisted of 6 ft. 6 in. of concrete and 3 ft. 3 in. of earth ; each work was surrounded by a barbed-wire entanglement, of the type known as " Simplex " in the German Army, 33 ft. wide and 5 ft. high. The parapet connecting the closed works had a command of from 6 ft. to 6 ft. 6 in. ; it was provided with loopholes and, at intervals, with shelters for 4 to 8 men apiece. The walls and roof of these shelters were constructed of concrete about 8 in. thick. A continuous line of obstacles was constructed in front of the whole length of this parapet.

A very large number of machine guns, electric-light projectors and other accessories had been provided for the defences of Tsing-Tao ;

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and in rear of certain sectors of defence a second line of trench works had also been constructed.

In proximity to the outskirts of the town and about 1¼ mile in rear of the parapets, etc., for the infantry, permanent batteries had been constructed on the three hills, named Iltis, Bismarck and Moltke; 11-in. howitzers and guns ranging from 4 in. to 8 in. calibre were mounted in these batteries. Emplacements for heavy artillery had also been constructed on the sea front; in some cases the guns were mounted *en barbette* protected by shields; in others they were protected by cupolas. Nine guns varying from 6 in. to 8·5 in. calibre were mounted in the two principal coast works.

The troops available for the defence of Tsing-Tao were as follows:—

	MEN.
3rd Batt. of Marine Infantry (5 companies) ..	1200
Detachment of Marines from Far Eastern Garrisons (3 companies)	450
Marine Artillery (5 companies)	900
Field Artillery	136
Pioneers (1 company)	116
Reservists, Volunteers, etc.	1,200
Total	4,002

To the above figure should be added the 1,000 sailors who were on board the Austrian cruiser *Kaiserin Elisabeth*, the German gunboat *Jaguar* and torpedo-boat S. 90. These vessels were at Tsing-Tao at the time the Japanese ultimatum was handed to the German Ambassador.

All available German civilians at Tsing-Tao not in the ranks were mobilized for police and other emergency duties.

A German officer had arrived at Tsing-Tao with a monoplane, three days before the declaration of war by Japan, and was the only person available for carrying out reconnaissances at a distance.

The landing of the first of the Japanese troops took place on the 2nd September, 1914, at Lung-Kou, on the northern shores of the Shantung Peninsula, some 125 miles distant from Tsing-Tao. This force first came into contact with the German troops on the 12th *idem*, at Tsimo, about 60 miles north of Tsing-Tao. The Japanese squadron blockading the Gulf of Kiao-Chow had some days previously bombarded Tsing-Tao and a Japanese airman had dropped a few bombs on the town. A Japanese torpedo-boat destroyer struck the reefs of Tschoucha-Tao, some 25 miles S. of Tsing-Tao, on the 31st August and the *Jaguar* sallied out of port to destroy the wrecked vessel.

The German marines and infantry had taken up their position in the works covering Tsing-Tao on the north-east, as soon as war was declared; they took in hand the strengthening of the same, as far as they were able to do so. The Japanese occupied Tsimo on the 13th September, 1914; Kiao-Chow on the 14th *idem;* and Liuting (about 40 miles N. of Tsing-Tao) on the 15th *idem;* heavy rains and inundations had added to the difficulties of the march. As soon as the German patrols had been driven back in rear of their advanced positions, a Japanese force

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of about 25,000 men were landed in Lao-Tschan Bay (about 80 miles N.E. of Tsing-Tao); the disembarkation was carried out with very little opposition.

The Japanese left, which advanced along the hilly ground skirting the coast, was supported by the fire of a Japanese squadron and made more rapid progress than the right wing which came under the fire of the Austro-German vessels in the Gulf of Kiao-Chow.

By the 18th September, the German troops had all been withdrawn to the line Kaiser-Stuhl-Litsun-Tsangkou (about 20 miles from Tsing-Tao). They were gradually forced back by the Japanese and by the 28th *idem* had been practically driven back into their permanent defences covering Tsing-Tao. The Japanese troops effected their purpose without suffering any considerable casualties.

A British battalion was landed in Lao-Tschan Bay on the 23rd September; it arrived too late on the scene to take part in the operations referred to above.

During this time, British and Japanese ships bombarded the German batteries on hills Iltis and Bismarck; but their fire does not appear to have been effective. The ships employed were old, nevertheless their armament compared favourably with that mounted in the German batteries.

The Japanese General Staff devoted the whole of the month of October to the preparations for the Siege of Tsing-Tao. Violent storms interfered with the construction of siege works and the landing of heavy artillery from the 12th *idem* and onwards. The Germans were also much inconvenienced by the weather and remained on the defensive after having unsuccessfully attempted a sortie with three companies on the evening of 2nd October. They were content to bombard the Japanese siege works during the daytime with their heavy artillery, their only airman assisting them in directing the fire of the guns. At night they lit up the ground with their projectors, etc., and occasionally swept the ground in front of their works with their machine guns. The Japanese worked exclusively in the night-time and rested during the day; the British-Japanese squadron alone coming into action in the daytime, and then only at long ranges. Nevertheless, the *Triumph* was sunk by a lucky shot, a torpedo destroyer was lost during a fog and two minesweepers were blown up. In spite of these accidents the British and Japanese sailors managed to remove the German mines in the zone south of Scha-Tzy-Kou (30 to 35 miles eastward of Tsing-Tao) so as to permit the landing of troops and stores on the coast bordering this zone.

During the night of 17th—18th October the German S. 90 succeeded in torpedoing the Japanese cruiser *Takachiho;* it then ran aground in Chinese waters.

Towards the end of October, the British and Japanese ships became more aggressive and from the 29th October to 1st November subjected the German coast defences to a violent bombardment. On the date last-mentioned, the German battery at Iltis was put out of action.

The weather then interfered with the operations of the fleet.

The general attack on the German land front began on the 31st

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October; the Japanese troops engaged numbered 37,700 men and the British 1,300 men. This force is said to have had 250 guns with it, including 11-in. and 12-in. howitzers.

During the first days of the siege, the fire of the Japanese siege guns was directed against the German batteries on the hills Iltis, Bismarck and Moltke. The guns in these batteries replied as best they could, but it was to little purpose.

On the 2nd November the *Kaiserin Elisabeth* was sunk; her complement, being saved, reinforced the troops holding the defences.

The German works were gradually destroyed by the bombardments of the 3rd and 4th November; during this period the Japanese infantry continued to gain ground and the British entered the German first line. On the 5th November, a violent counter-attack drove the British troops from the German works they had seized.

On the morning of the 6th November, the German aviator left Tsing-Tao with the colours of the 3rd Batt. Marine Infantry and succeeded in landing on Chinese territory. The defenders were now at the end of their resources. During the night of 6th—7th November a Japanese force made a lodgment in the German position and rapidly extended their hold on it to the right and left of the works they had seized. At 6 p.m. on the 7th November the Germans hoisted the white flag, having, in the meantime, sunk the *Jaguar* and destroyed her armament.

Tsing-Tao at once passed into the hands of the Japanese troops.

The author of the *Revue* article states that he is indebted to an article by Major Knox, 36th Sikhs, which appeared in the *Journal of the United Service Institution of India*, for a great part of his information relating to the Japanese operations against Tsing-Tao.

IMPRESSIONS FROM THE AUSTRO-HUNGARIAN FRONT.

V. The Fourth Battle of the Isonzo (12th November—5th December, 1915).

The article begun in the *Revue* for August, 1916 (*vide R.E. Journal* for November, 1916), is continued in the number under review; in it are given the experiences of the writer of the article whilst he was with the Austrian 7th Army Corps in November, 1915.

A panoramic view of Mont San Michele and the Cormons Plain taken from the hill S. of San Grado Di Merna accompanies the text.

The fourth Battle of Isonzo was fought over exactly the same ground as the other battles of this name. The principal attacks were directed against the Tolmino and Goritz bridgeheads, Santa Luzia, Monte Sabotino, Podroga and the plateau of Doberdo.

The author of the *Revue* article expresses admiration for the perseverance and bravery shown by the Italian troops in surmounting the difficulties met with in their attacks on Mont San Michele.

The Italian heavy artillery had for three days (9th—12th November, 1915) vigorously bombarded the Austrian front extending from the point where the Vippacco flows into the Isonzo to San Martino, having an extent of nearly 2 miles. Between 8 and 9 a.m. on the 13th November the thunder of the guns increased in violence and the summit of Mont San Michele became enveloped in a reddish cloud. Artillery

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barrages were laid by the Italians on the line of the Vallone and further in rear towards Lokvica and Oppachiasella.

At about 9 a.m. three to four Italian Divisions were sent forward against the Austrian defences on the slopes of Mont Michele. The attacking columns were broken by the Austrian fire before reaching their objective. The Italians had to retire; whilst they were doing so the roar of the battle increased towards San Martino and Monte Dei Sei Busi; the Austro-Hungarian Artillery was particularly active in this sector. But here also the Italians were not able to make progress.

It is stated that the Italian Artillery fire was extremely accurate; guns of various calibres from 6 in. to 15 in. are said to have been in use. The Austro-Hungarian Artillery was in action in emplacements without overhead cover, and was distributed in groups of a couple of guns; these guns were frequently moved from one position to another. It suffered very little loss as compared to the infantry. The Austrians had a number of 12-in. mortars, having a range of 6 miles, which they used singly close up to the fighting line; concrete platforms were provided for them. They were provided with mechanical transport and a contractor's tramway track was provided for bringing up the ammunition.

The next event of importance was the bombardment of St. Goritz by the Italians during the 21st and 22nd November, 1915. The civil population, for the most part, fled from this locality to Laibach and Trieste. The Austrian Artillery replied with vigour. Many villages were destroyed by artillery fire during this period. The battle continued without a moment's respite. The Italians fully realized that the capture of Mont San Michele would lead to the fall of Goritz, and therefore pushed their attack by night and by day.

Notes and News.

Switzerland.—A special correspondent contributes an article relating to Swiss affairs. The changes in the commands of the Swiss Army Corps and Divisions carried out recently are referred to. Colonel Wildbolz has been appointed to the command of the 1st Army Corps, and Colonel Schiessle to that of the 2nd Army Corps; Colonel Audeoud remains in command of the 3rd Army Corps. Colonel Gertsch has succeeded to the command of the 3rd Division and Colonel Bridler to that of the 6th Division. Colonel Biberstein has recently been appointed Commandant of the Gothard Defences.

Announcements appear relating to the death of Colonel Meister, who at one time commanded the 6th Division, and of Eugene Fonjallaz, Councillor of State, who was for many years in charge of the Military Department of the Vaud.

The recent decree of the Federal Council ordering the mobilization of the 2nd, 4th and 5th Divisions is referred to. It is stated that *since Germany has officially announced her intention of employing every means possible for the prosecution of the War and definitely stated that she has no scruples as to the lengths she will go in this matter* no one in Switzerland would be satisfied to leave the protection of the Swiss frontier to a single brigade. After the mobilization of the three divisions in question,

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the public will be easier in their minds; they would feel happier still to have six divisions on the frontier. The writer of the article says: "From the military point of view, it would be in our interest naturally best to mobilize our whole army and to maintain it on a war footing until the situation becomes clear, as was, in fact, done in 1914." He also considers that a mobilization of the Swiss Army would be a good thing from a political point of view, now that the United States of America has shown in which direction her rulers are prepared to exercise their influence.

International Affairs.—Colonel Feyler contributes an article relating to the blockade proclamation issued by Germany and the questions arising out of it as they affect Switzerland.

He points out that Germany's proclaimed intention of establishing a blockade against Neutrals, in order indirectly to get at her enemies, has rendered the position of Neutrals exceedingly acute; the blockade is an attempt to put intolerable limits on their sovereign rights.

So far as the invitation of President Wilson to the Neutral Powers, including Switzerland, to join with him in severing diplomatic relations with Germany is concerned, Colonel Feyler states that putting aside the great difference in the risks run by Switzerland and the United States of America in breaking with Germany, where, as it is pointed out, one State is within the immediate range of German guns and has a frontier protected from invasion only by an inconsiderable obstacle, such as the Rhine, and the other State has the protection of a broad ocean between it and its possible enemy, the difference in the fundamental policies of these two Neutral Powers must be given due consideration.

Switzerland is bound by the Declaration of Vienna to maintain *Perpetual Neutrality* and can take no political action in Europe in violation of this obligation. The United States of America has a free hand in the action she is at liberty to take.

Colonel Feyler next discusses whether the honour and dignity of Switzerland is affected by the German blockade declaration, and comes to the conclusion that they are affected. He considers that the protest sent by the Federal Council to Germany on the subject is drawn up in strictly correct language; the Federal Council take their stand on the solid ground of Sovereignty, such as is guaranteed by International Law to all nations alike; they make it clearly understood that the Swiss nation desires to remain faithful to its Treaty obligation of Neutrality; at the same time the Council expect the belligerents to respect the essential rights which Switzerland possesses as a Sovereign State.

INFORMATION.

An obituary notice relating to Capt. Chavannes, Deputy for Vevey, appears under the above heading. He joined the Swiss Army as a recruit in 1879, at the age of 19 years, and was gazetted Lieutenant in 1882 and Captain in the Carbineers in December, 1891. He was transferred to the Landsturm in the rank of Major in January, 1910, but by special request was allowed to retain his rank of Captain. He was a fine type of Swiss officer.

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This number concludes with a *Bulletin Bibliographique*. A reference is made to the considerable amount of War literature which has been published in Europe. Short notices are given of some of the more prominent works issued recently.

Supplement.

The first part of a supplement entitled *L'Occupation des Frontières par les Troupes Suisses en* 1870—1871, by Colonel Galiffe, is issued with the number of the *Revue* for February, 1917.

In an introductory notice it is stated that the present appears to be a favourable opportunity for placing the late Colonel Galiffe's work in the hands of the public; further, the publication of the work also enables an act of posthumous homage to be done to the memory of a distinguished officer.

The first part of this work is entitled *Préliminaires*.

Chapter I. is devoted to *The Measures taken by the Federal Government* and contains a very brief reference to the candidature of a Hohenzollern Prince, in 1870, to the Spanish throne and the guarantees demanded by Napoleon III. from the Prussian King, after the latter had approved of the withdrawal of the candidate, a member of the Prussian Royal House. This demand was utilized by Bismarck, as is well known, as the pretext for forcing on the war between Prussia and France.

The measures taken by the Federal Government with a view to ensuring respect for the Neutrality of Switzerland, guaranteed by the Treaty of 1815, are then shortly described in this Chapter. The main points of the Ordinance published by the Federal Government on the 18th July, 1870, relating to the maintenance of the Neutrality of the Swiss Republic are briefly set out.

Chapter II. provides particulars concerning *The Federal Army in* 1870. The military organization of the Confederation was at that time regulated by a Law of 8th May, 1850, which divided the Swiss population into three categories and imposed the following obligations on the male population :—

(i.). Service in the *Élite* for men between 20 and 34 years of age, up to a total of 3 per cent. of the population.

(ii.). Service in the *Reserve* on transfer from the *Élite* between the ages of 35 and 40 years, up to a total of $1\frac{1}{2}$ per cent. of the population.

(iii.). Service in the *Landwehr* for all men below 44 years of age who had received military training and were capable of bearing arms. The *Landwehr* was a Cantonal organization, but the Federal Council had power to utilize it in an emergency.

Each category of troops was embodied in separate tactical units. The infantry received its training uuder the Military Departments of the Cantons, whilst the Central Authorities were directly responsible for the training of the Carbineers and technical troops. Details of the organization of the Swiss Army at this date are given in this Chapter.

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On the 1st January, 1870, the Federal Army consisted of nine divisions, total strength 203,053 men, made up as follows :—

General Staff	805 men.
Élite	85,563 ,,
Reserve	50,146 ,,
Landwehr	66,539 ,,

In Chapter III. information is given concerning the *Points of Access across the Frontier and the Railway System on the Northern and Western Fronts.* It contains a useful summary of the topographical features of the frontier that are of importance from a military point of view.

The Second Part of this work is provided with an Introduction entitled *Les Opérations.* It is pointed out that when the Federal Council ordered the mobilization of five Swiss divisions in July, 1870, war had not actually been declared. It was naturally impossible to predict the course of events nor was it known whether the Southern States of Germany would espouse Prussia's cause. As soon as the early German successes had resulted in a withdrawal of the French Armies into the interior, and it became apparent that the danger of an invasion of Switzerland by the belligerents was remote, the Federal Council at once reduced the number of troops mobilized and provision alone was made by it for police duties on the frontier ; *e.g.* those dealing with deserters, refugees from belligerent territories, etc.

This period during which the Swiss Army was on the frontier can be divided into three distinct phases :—

i. Period of demonstration, from middle of July to end of August, 1870.

ii. Period of observation, from beginning of September to end of December, 1870.

iii. Defensive Period, from first days of January, 1870, to end of February, 1871.

The next section of the work is entitled *Période Démonstrative.*

Chapter I. is devoted to *The Belligerents* and in it is furnished brief details of the mobilization of the French and German Armies, and the concentration of the French 7th Army Corps at Belfort, when the information of the German successes at Wissembourg, Wörth and Spicheren reached General Douay, its Commander.

Chapter II. entitled *In Switzerland* is begun in this part of the Supplement.

W. A. J. O'MEARA.

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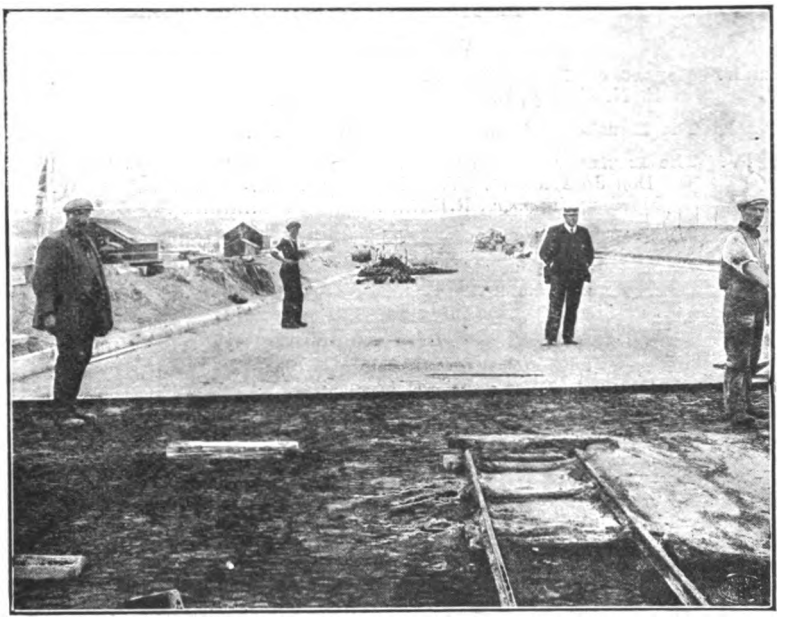

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